Better Homes and Gardens®

# WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

JANUARY 1994 • ISSUE NO. 67
Please display until January 10

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## WHAT'S WHAT IN PAINTBRUSHES

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## PLEASIN' PROJECTS
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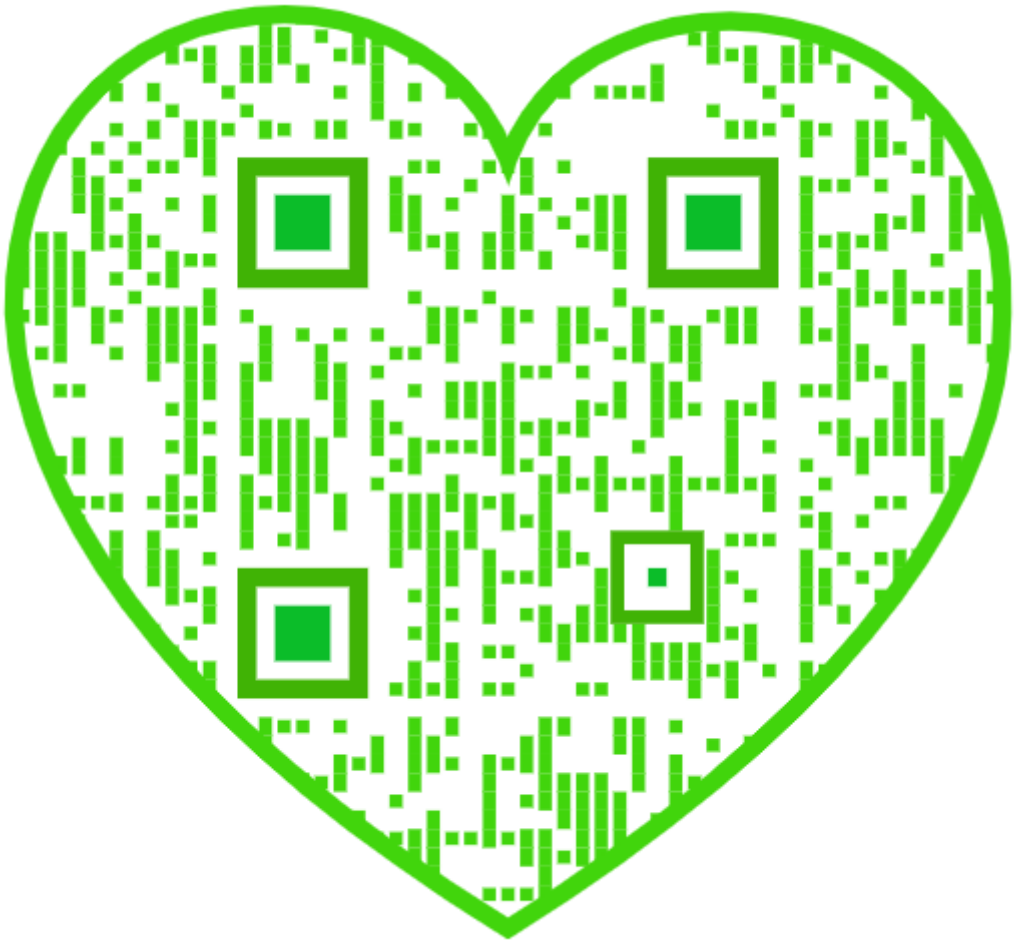

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## THE EDITOR'S ANGLE

# GEORGE & PAULINE REID

## CELEBRATING A LIFETIME OF WOODWORKING EXCELLENCE

▲ George and Pauline Reid at home reliving their woodworking memories through the pages of their scrapbooks.

▼ George's framed, carved sampler depicting key design elements of various classic furniture styles—a present for his grandson.

Last fall, when I was making plans to do some project scouting at the Artistry in Wood show in Dayton, Ohio, my host, Max Marshall, insisted that I take the time to meet George Reid. And I'm glad I did! No one better embodies the woodworking professional in every sense of the word than my new friend.

For the past 50 or so years, this mild-mannered craftsman has earned a comfortable living doing custom woodworking for Dayton-area residents. If someone wants a Colonial-style secretary in three parts or a Queen Anne-style American dressing table or any other piece of period furniture for their house, they know that George can build it. He's also got quite a reputation locally for being able to determine the authenticity of period pieces.

While I was visiting with George, his wife Pauline asked if I would like to see some of the scrapbooks the pair has kept over the years. The books contain scores of press clippings about the people George has done work for. I could sense the immense pride the Reids feel when they flipped the pages and talked about how so and so was now president of a local bank or that George had done work for three generations of a prominent family. For George, building furniture pieces has been more than a job; you might call it a lifelong passion.

Though George has kept plenty busy with his business over the years, he's also managed to build an entire house full of furniture for Pauline as well as pieces for his daughter and granddaughters. And as a special present to a grandson who does architectural work in New York City, George fashioned a wonderful framed sampler shown *above* depicting the key design elements of classic furniture styles.

Thanks, George, for taking the time to share your experiences with me. And Pauline, your graham cracker cookies were terrific! I can still taste 'em.

Photographs: Martin Biel

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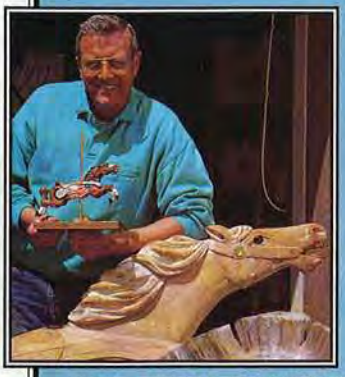
JANUARY 1994 ISSUE NO. 67



WOOD PROFILE

**Yellow poplar: The do-everything wood that's priced right.....21**

Sometimes called tuliptree, this versatile wood becomes construction lumber, moldings, plywood cores, furniture, and even caskets.



CRAFTSMAN CLOSEUP

**Merry-go round menagerie .....23**

Say hello to Kansas carver Jerry Reinhardt, a historian of carousels in America and an expert carver of 11"-high horse replicas which he regularly sells for $400 apiece.

SHOP - TESTED TECHNIQUES

**On-the-money miters.....28**

Discover the most effective ways to cut clean, super-accurate miters. Then, learn what types of joints work best and how to glue and clamp them for maximum durability.

**Angle-master miter jig.....34**

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**Show-stopping picture frames.....40**

Put your newfound knowledge on miters to work making the traditional or contemporary designs featured here. While you're at it, try our new miter jig.

TURNING

**Pulls with pizazz .....44**

Give your ceiling fans, lamps, blinds, and curtains a fresh look by replacing their inexpensive plastic pulls with ones of beautiful turned wood.

*This issue's cover wood grain : Yellow poplar*


**Norwegian folk craft in wood** ..... 46
See pleasing examples of the rich, proud woodworking tradition of Norway gathered up by our roving Scandinavian scout, Harley Refsal.

**Terrific tambour bookcase** ..... 48
Add flair and storage to a ho-hum wall in your home with this modular masterpiece. Instructions provide a bill of materials and cutting diagram for a two- or four-unit project.

**Brush basics** ..... 54
What's the difference between a china- and nylon/polyester-bristle brush? How do you use a brush? And, what's the best way to clean and maintain one? Find the answers inside.

CARVING
**Snappy the turtle** ..... 58
This good-natured reptile may be slow in the flesh, but in wood he's quick to shape and detail.

WHAT WOODWORKERS NEED TO KNOW ABOUT...
**Cyanoacrylate adhesives** ..... 62
Stick wooden parts together in a jiffy with the speedy bonding products spotlighted here. Talk about problem solvers!

CRAFT SHOP
**What a show-off!** ..... 64
Store something precious in this elegant see-through display project.

**Wetlands silhouette** ..... 66
Scrollsaw this very special blue-heron clock.

**Don't let wood irritate you** ..... 68
Keep your distance from toxic sawdust with these safety tips.


**SHORT-SUBJECT FEATURES**


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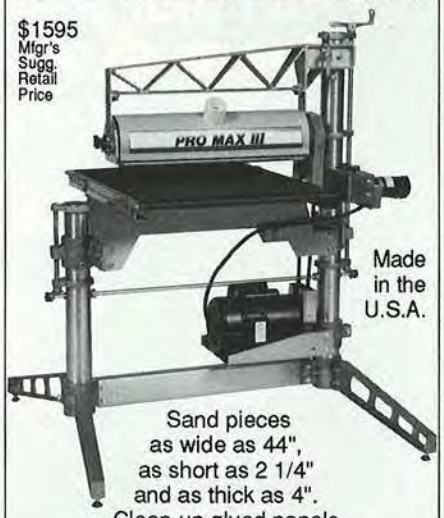


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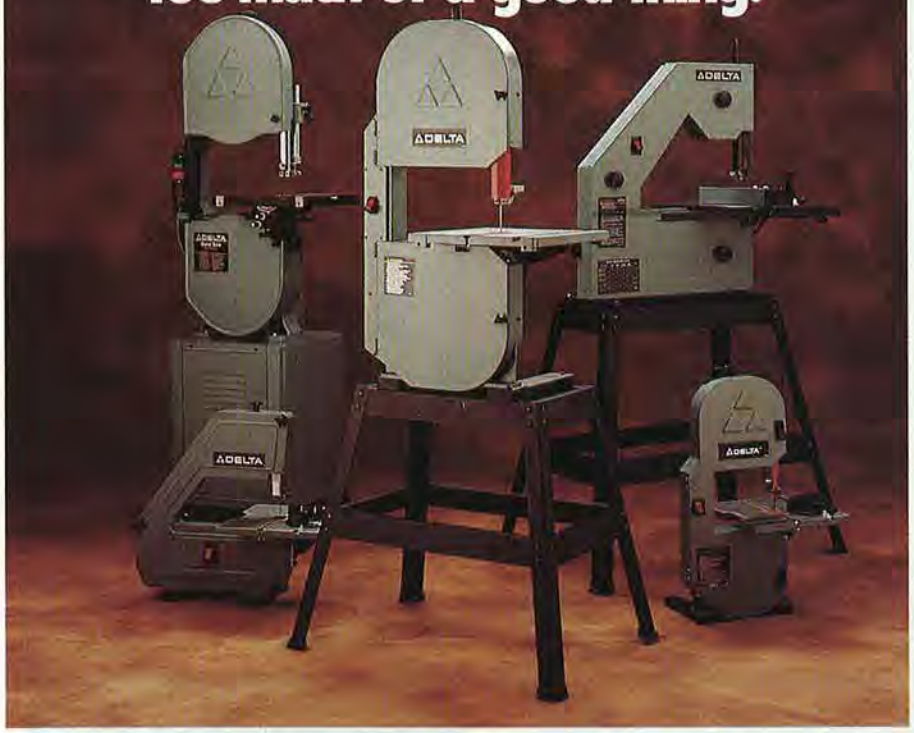

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# TALKING BACK

Print this article

**We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes and Gardens® *WOOD*® Magazine, 1912 Grand Ave., Des Moines, IA 50309-3379.**

## Easy grain alignment for plugs

The technique in the "Clean-As-Can-Be Screw Plugs" article from the September 1993 issue can be made easier. As a woodworker with arthritis, I found a method that reduces fumbling around with small pieces and still allows me to line up the grain when using the plugs.

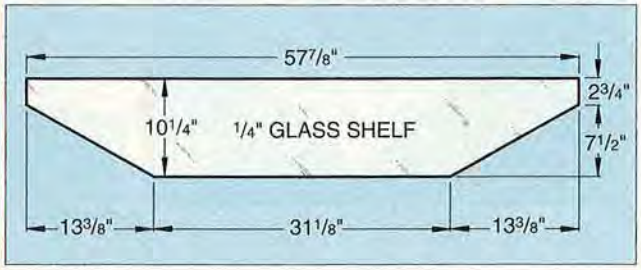
Rather than make a pencil line on the plugs parallel to the grain, I place a strip of tape over the plug cut-outs, in the direction of the grain. I press the tape firmly onto each piece. When the plugs are bandsawn loose, they remain fastened to the tape, and are easier to line up with the hole and to match for grain.

*—Randy Johnson, Hartford, Wis.*

## Resize the glass shelf

While building "A Credenza with Charisma" from the April 1993 issue, I noticed that the measurements for the glass shelf were incorrect. I have included the correct dimensions for the shelf in the drawing *below*.

*—Joseph Perrin, Jr., Clearwater, Fla.*




## We can't lye about it

I was very interested in your article "Rust Removal Made Easy" in the September 1993 issue. I'm always looking for a better way of cleaning my old tools without damaging the authenticity of the tool. After going to my hardware store to buy a bottle of lye, I was told that it is no longer available on the open market because of the hazardous chemicals it contains. How can I buy some lye?

*—Mike Flaim, Cincinnati*

*We found lye available at a local supermarket, Mike, where it was advertised for septic system and sewer cleaning. We strongly recommend handling this hazardous chemical according to the safety instructions on the container. Never handle lye without hand and eye protection.*

## Why Honduras mahogany?

In your article "Craftsman-style Wall Lantern" in the August 1993 issue you suggest using Honduras mahogany rather than Philippine mahogany in building the project. Why so?

*— Neville K. Connolly, Bethesda, Md.*

*Thanks for asking, Neville. Other woodworkers have wondered the same thing. We chose Honduras mahogany because it is stable and durable in varying weather conditions. This wood also shows an evenness in workability across boards from different trees.*

*Philippine mahogany is a term allowed under U.S. law to describe wood from a variety of trees of several similar species, none of which are true mahoganies. These trees are found in the Philippine Islands, Indonesia , and areas of Southeast Asia. Wood taken from this many different trees will show as many differences in workability, stability, and resistance to decay as the types of trees harvested. Generally, the darker red species classed as Philippine mahogany produce the most durable wood. Yet none of these species are as stable or as decay resistant as Honduras mahogany.*

## About that much

In your "Raised Panels and Frames" article in the August 1993 issue, you do not give the angle to tilt the saw blade for cutting the panels.

*— F. G. Coniglio, Buffalo*

*F.G., the old woodworker's measurement of 'about that much' comes into play in this situation. The exact angle of the saw blade to cut bevels on raised panels will vary according to the width of the reveal (the beveled area of the panel showing on the assembled frame and panel).*

*To set your saw blade, first mark a line on the edge of your panel from the inside bottom corner of the 1/8" saw kerf outlining the panel face to the 1/4" setback at the panel's outer edge. Set the panel behind the blade with its back face against the saw fence. Sight along the blade and adjust the tilt mechanism until the angle of the blade lines up with the mark on the panel. Test this setup on scrapwood of the same thickness as the panel, and adjust the saw tilt as necessary.*

*Continued on page 9*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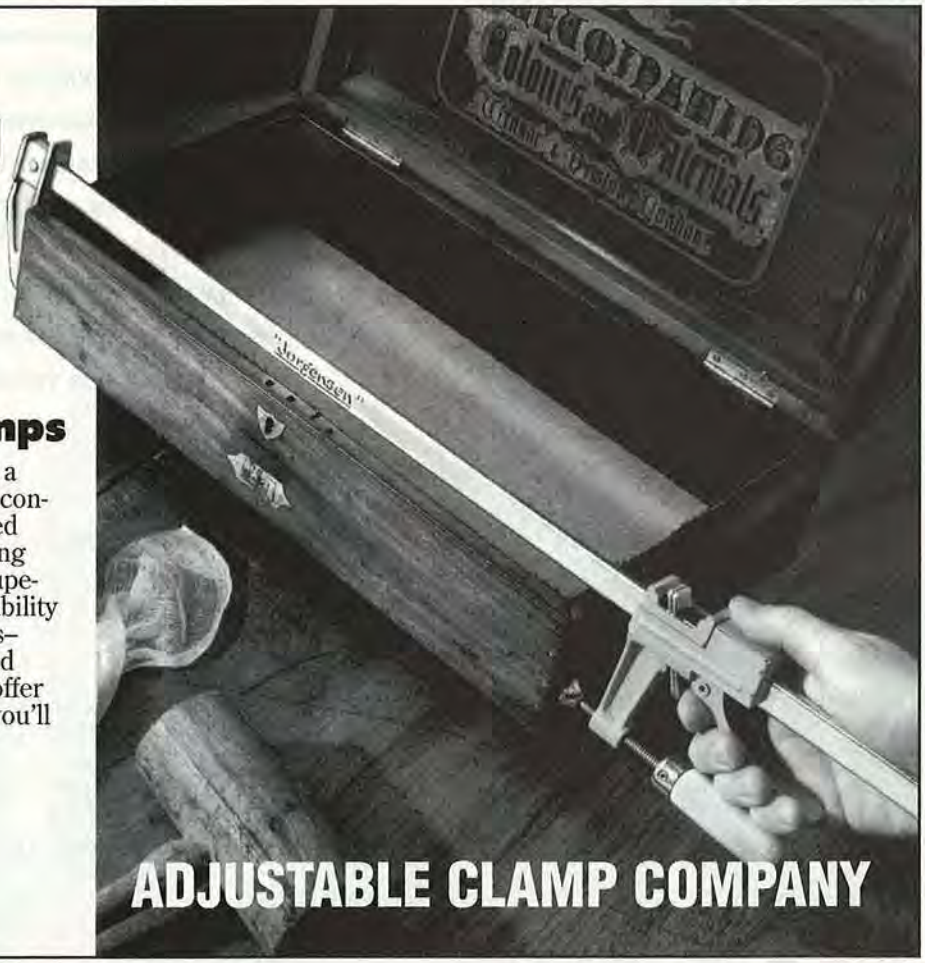

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# TALKING BACK

*Continued from page 7*

## Trouble in River City

*Raccoons have always had a reputation for being mischievous, and the Raccoon River which runs behind our building here in soggy Des Moines is no exception. During our summer of floods, the high water actually entered our buildings and wiped out much of our supply of back issues. If you have a complete set of WOOD magazines, it's value just skyrocketed. For those of you in need of a back issue, we still have a limited supply, but it will likely go fast. To order call 800/572-9350. If not sure which issue you want, buy our new* WOOD CUMULATIVE INDEX.

## Safety warnings on rust remover

The article "Rust Removal Made Easy" in the September 1993 issue should have provided information on the possible hazards of the process. Mr. Price's recommendation of using the rust remover outdoors is well founded. These fumes not only smell bad, they also contain hydrogen and oxygen, an explosive mixture.

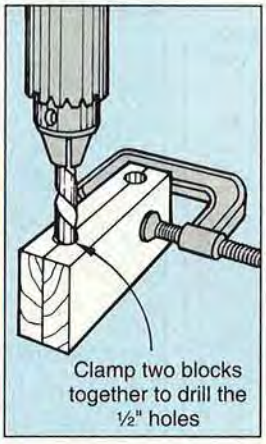
Mr. Price is also correct in suggesting that you turn off the charger before removing the leads. This eliminates the possibility of an electrical spark setting off the fumes. Additionally, I would suggest not smoking in the area, and to never perform this rust removal with a lid on the container. An accumulation of these fumes could cause an explosion of sufficient force to cause injury from both impact and the caustic solution.

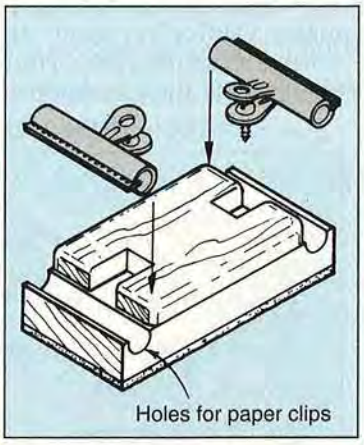
***— Rick Collins Sr., Dearborn Heights, Mich.***

## Groovy sanding block

The "Paper Clips Grip Sandpaper on Block" tip from Rene Stebenne in the June 1993 issue is an excellent idea. After purchasing the clips and installing them as you suggested, I decided to try drilling a groove across the block for the clip body to rest in. It worked out beautifully, holding the sandpaper more firmly.

***— Bob Thelmos, Whittier, Calif.***



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## EARN CASH, PRIZES FOR YOUR TOP SHOP TIP

Do you have a great shop tip (or two) you'd like to share with other *WOOD*® magazine readers? For each published submission, you will receive at least $40 from *WOOD* magazine. (You could get as much as $200 if we devote a page or more of space elsewhere in the magazine to your idea.) You also may earn a woodworking tool if yours is chosen as the Top Shop Tip for the issue.

We try not to use shop tips that have appeared in other magazines, so please send yours to only one. *We do not return shop tips.* Mail your tip(s), address, and daytime phone number to:

**Top Shop Tip**
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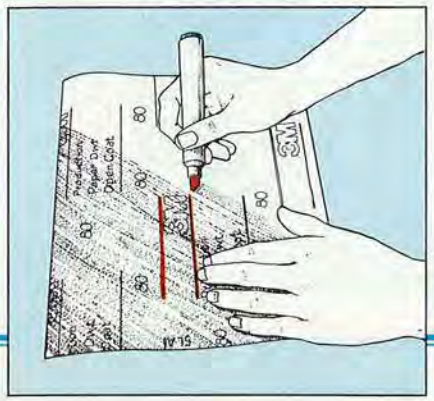
### Colors denote grit on cut-up sandpaper

*When you cut a sheet of sandpaper into smaller pieces, you can bet several won't have the grit number on the back. That makes it tough to pick the one you need.*

**TIP:** Before you cut the sheet, scribble a crosshatch pattern on the back with a colored marker. Each cut piece then will have colored lines on the back. Use a different color for each grit, and make a color-key chart to keep with the sandpaper. Then, you can identify the grit readily.

***–Daniel Angert, Orlando, Fla.***

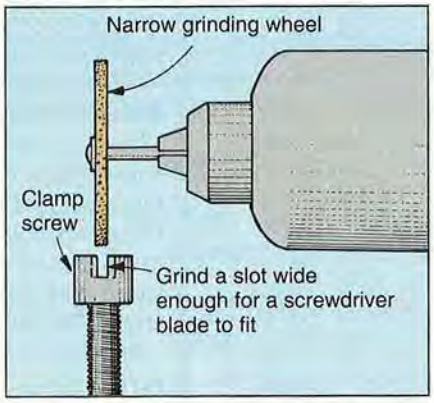


### Slot lends new life to scrollsaw screws

*Lots of scrollsaws employ allen-head screws to clamp the blade holders onto the blade ends. Repeated loosening and tightening wears out the hex-shaped recess in the clamp-screw head, making it impossible to tighten the blade clamp sufficiently with an allen wrench.*

**TIP:** Cut a slot in the clamp-screw head. A hacksaw with two blades or hand-held rotary tool with a narrow grinding wheel will do the job in short order. When you're done, you'll have a blade clamp you can tighten and loosen with an ordinary screwdriver.

***–Robert T. Hernandez, Krebs, Okla.***



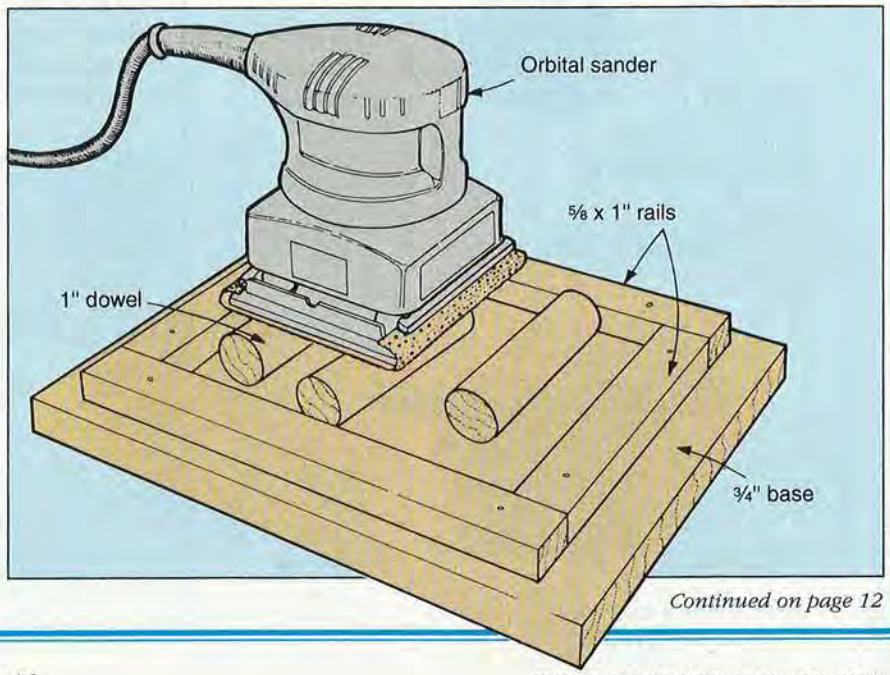
**For his tip, Robert receives a Dremel model 3952 variable-speed Moto-Tool super kit, shown *left*.**

### Corral those dowels when sanding time rolls around

*You've cut some short dowels for toy parts. Now you need to sand them, a chore that's slow-going.*

**TIP:** From scrapwood a little more than half the thickness of your dowels (⅝–¾" thick if you're sanding 1" dowels, for example), cut two 1"-wide strips about 12" long and two a little longer than your dowels. Arrange the strips in a rectangle on a base of plywood or other suitable material, and tack them down. Now, round up your dowels and corral a few at a time inside the fence. Turn on your orbital finishing sander and roll it back and forth on the dowels. The fence strips will keep the dowels from getting away as you sand them quickly and effectively.

***–Frederick Koster, Yorktown Heights, N.Y.***




*Continued on page 12*

# HOW TO FIND YOUR WAY THROUGH THE WOODS.

In woodworking, every project is an adventure. You explore the wood, studying its grain, searching for something hidden within.

Your goal is to emerge, weeks later, with a proud souvenir. A planter. A Shaker chair. Or perhaps a rustic chest of drawers.

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When it's time for assembly, try the innovative HD 1605 plate joiner. Simply cut matching slots, pop in a wooden biscuit, glue and you have yourself a quick, durable joint.

Once it's all together, give your project a once over with the HD 7575 palm grip sander. The 7575 performs an exacting 1/16″ orbit 13,000 times a minute for a fast finish.

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## TIPS FROM YOUR SHOP (AND OURS)

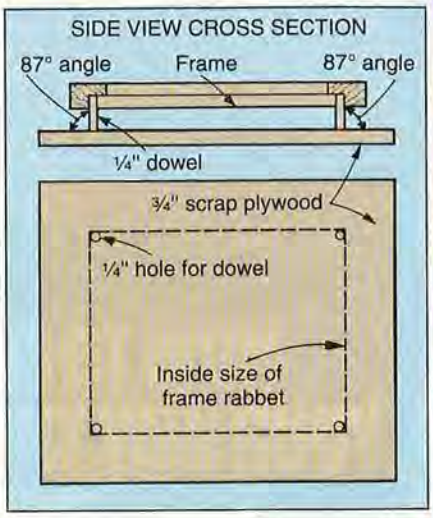
*Continued from page 10*

### Fixture holds frames for easy finishing

*When it comes time for finishing a picture frame, you often end up pushing it all over the benchtop. Most are just too light to stay put while you brush on finish, especially on the edges.*

**TIP:** Build this fixture from a piece of plywood and four dowels, and you'll fear frame finishing no more. On the ¾" plywood base, draw a rectangle the same size as the inside of the rabbeted opening in the frame (5×7" for a frame that holds a 5×7" photo, for example). Drill a ¼" hole inside the pencil line at each corner, angling it outward about 3°. Insert a 4" length of ¼" dowel into each hole. For finishing a frame, press it onto the dowels—the tension created by forcing the dowels toward vertical will hold the frame firmly. You'll be able to reach the edges easily, too.

*—Gene Washer, Shelburne Falls, Mass.*




### Paper mask prevents fogged-up glasses

*You know you should wear a particle mask when you're making sawdust in your shop, but the rigid masks cause your glasses to fog up. Do you have to choose between breathing and seeing?*

**TIP:** Disposable paper masks, the kind doctors and nurses wear, work just fine with glasses. They're flat, and look somewhat like a pleated facial tissue. A thin strip of soft metal in the top edge conforms to the bridge of your nose; the elastic bands fit behind your ears to hold the mask to your face. Medical and sickroom-supply dealers sell the masks.

*—Judy Coffey, Elk Grove, Calif.*

*Continued on page 15*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| 33-060 | Sidekick F&T Saw | 368 |
| 36-040 | 8" Compound Miter | 155 |
| 36-090 | Sidekick 10" Miter Saw | 218 |
| 36-220 | 10" Compound Miter | 234 |
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## Or How Does A Simple Idea Grow Into A Catalog?

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A simple "**Bargain Box**" got the whole idea in motion. Twenty pounds of sanding materials left over from our automated manufacturing systems were packed into a box and sold at the unbelievable price of only **$29.00** (plus **$3.50** shipping and handling)! Some of the more daring woodworkers out there, not knowing what they were getting into, gave this deal a try. In no time, the word was getting out that no other sanding materials compared to the ones offered in the Bargain Box. One thing lead to another and a small catalog was born. Most of you have probably seen, heard of or even ordered from **Klingspor's Sanding Catalogue** over the years and the good news is the Bargain Box is still available. You simply cannot get a better deal anywhere—you choose the grits you want in any combination of C=coarse, M=medium or F=fine.

## $29 Bargain Box

*Choose any combination of coarse, medium or fine grit.*

## $29 Box of Belts

*Choose from 2½" x 16", 3" x 18", 3" x 21", 3" x 24", 4" x 21" and 4" x 24".*

Then to further the story, **Klingspor's Sanding Catalogue** developed another "Bargain" to show you, the woodworker, the quality of the materials offered and to entice you to order and get the value you deserve from your sanding products. What came about next rocked the whole woodworking industry—the "**Box of Belts**". How could a mail-order company possibly sell 36 sanding belts for only **$29.00** (plus **$3.50** shipping and handling)? That's only $.80 per belt—totally unheard of! The most common portable belt sizes are offered: 2½" x 16", 3" x 18", 3" x 21", 3" x 24", 4" x 21" and 4" x 24" (the 4" wide belts have 30 per box) and the best part is you choose the grits. Extra coarse, coarse, medium, medium-fine, fine and extra-fine grits make this a no-lose situation. There are six belts in each grit pack (five in the 4" wide belts); you choose six of the packs in any combination and you've got your Box of Belts.

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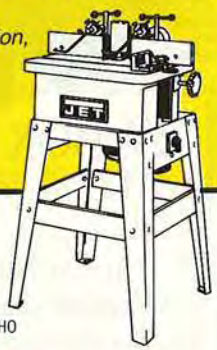

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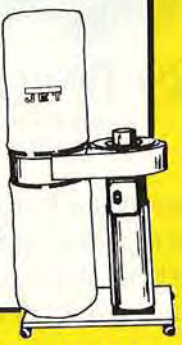


***Find out how good the NEW JET really is!***

## TIPS FROM YOUR SHOP (AND OURS)

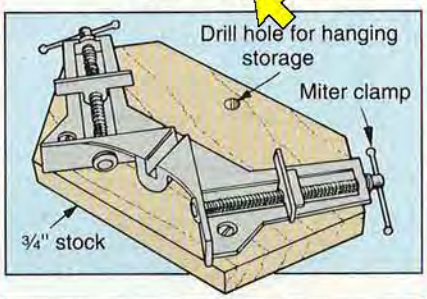
*Continued from page 12*

### Base makes miter clamps handier to store and use

*Your vise-type miter clamps take up a lot of drawer space between uses. It would be handier to hang them up, but they don't lend themselves to that.*

**TIP:** Make a ¾" scrapwood base with a hanging hole for each clamp. Set the clamp on your stock, and trace around it. Leave extra material for the base at the back of the clamp where shown. Bandsaw or scrollsaw along the base outline, and drill a 1" (or other convenient size) hanging hole where shown. Attach the clamp to the base. In addition to providing a handy hanging hole, the base elevates the clamp above the bench, making the handles easier to turn.

*–David Hague, Warren, R.I.*




### MORE TIPS FROM OUR WOODWORKING PROS

- Make your blade and router table guards with ¼" polycarbonate. This shatterproof material impressed us so much we specified it for our tablesaw miter jig, shown on *page 34*.

- Duplicate the stop system from the miter jig shown on *page 38*, and add it to your radial-arm saw fence for a quick-lock stop for cutting multiple pieces to the same length.

- Cut spline kerfs as illustrated on *page 43* to add a bit of decoration and strength to your next mitered picture frame or jewelry box.

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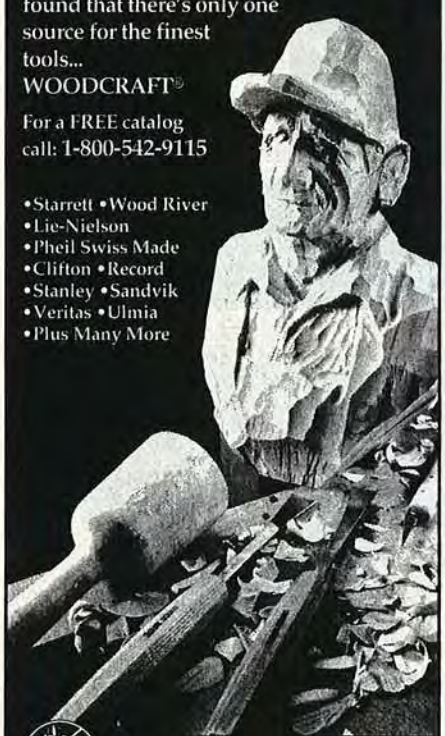

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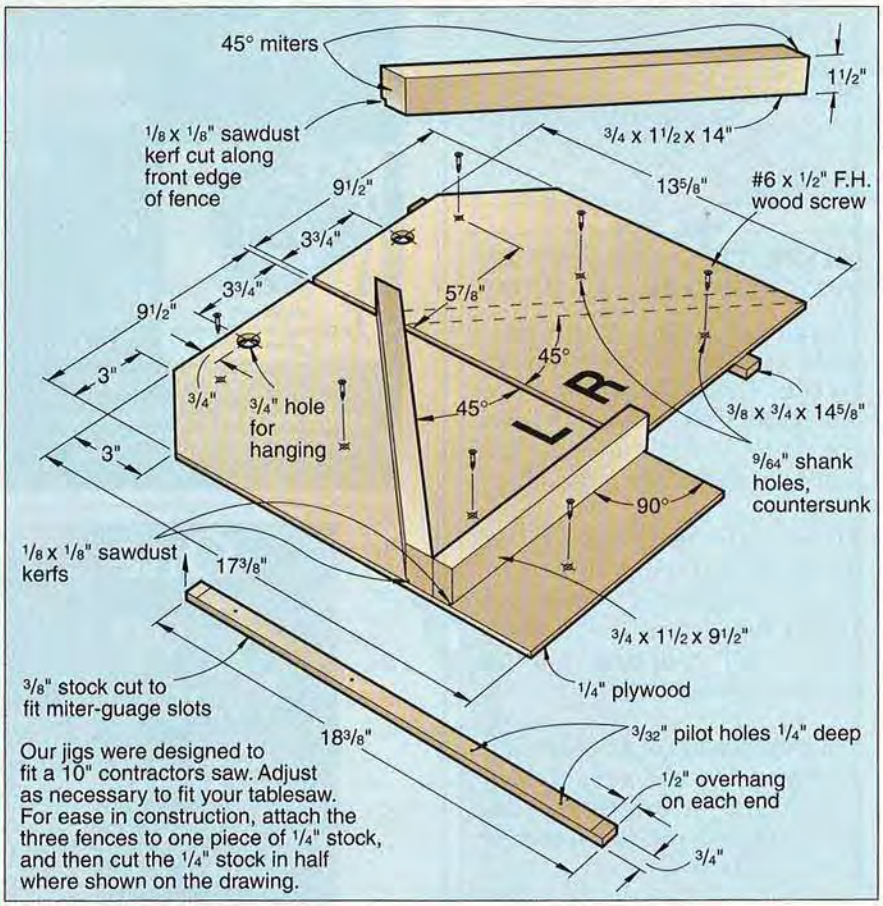
**GREAT IDEAS** FOR YOUR SHOP

# HANDY MITER JIGS

Cutting square and accurate 45° miters just got a whole lot easier with these angled tablesaw miter jigs. The jig marked R on the drawing fits on the right-hand side of the blade as shown *above left*. The jig marked L, shown *above right*, fits into the miter-gauge slot on the left-hand side of the tablesaw blade.

Use either jig for miter-cutting 45° angles. Or, turn the jig marked L end for end, and use the fence to support pieces when crosscutting them at 90° as shown in the photo *above right*. Carefully position and glue the ¾×1½" guides in place; the angles cut are only as accurate as the positioning of the guides.


45° miters
1½"
¾ x 1½ x 14"
⅛ x ⅛" sawdust kerf cut along front edge of fence
9½"
13⅝"
#6 x ½" F.H. wood screw
3¾"
3¾"
9½"
5⅞"
45°
3"
¾"
¾" hole for hanging
45°
L
R
⅜ x ¾ x 14⅝"
3"
9/64" shank holes, countersunk
90°
⅛ x ⅛" sawdust kerfs
17⅜"
¾ x 1½ x 9½"
¼" plywood
⅜" stock cut to fit miter-guage slots
18⅜"
3/32" pilot holes ¼" deep
½" overhang on each end
¾"
Our jigs were designed to fit a 10" contractors saw. Adjust as necessary to fit your tablesaw. For ease in construction, attach the three fences to one piece of ¼" stock, and then cut the ¼" stock in half where shown on the drawing.

Design copyrighted by *WOOD* magazine

## RBI Hawk Precision Scroll Saws

*Hawk Scroll Saws are perfect to begin or complement any workshop. Cut wood, metal, glass, plastic, fabric and more. It's the most versatile tool you'll own.*

**A Few Reasons Why RBI Hawk Scroll Saws Are The Best You Can Buy.**

**Patented Quick Change Blade Holder** — for the fastest and easiest positioning of saw blades there is.

**Patented Rear Cam-Over** — quick and easy tension setting. An RBI exclusive feature.

**Patented Hold Down Foot** — for maximum control when making intricate cuts.

**Patented Cam-Over Tension and Upper Blade Holder** — allows you to change blades in just seconds and make inside cuts quick and easy.

**Extra Large Cast Aluminum Table** — tilts full 45 left & right unlike other scroll saws which tilt only one way.

**Safety Stop & Spring** — assures safe operation even when a blade breaks.

**Flex Bellows** — keeps work area clear for better visibility and safety.

**Precision Crafted Steel Base & Legs** — for smooth, vibration free operation.

# If Only Leonardo Da Vinci Had An RBI Hawk Scroll Saw.

Artwork created by intarsia artist David Irwin

## The Good News Is That You Can.

Leonardo would have envied the superior craftmanship that goes into every RBI Hawk Precision Scroll Saw. Now you'll create the woodworking projects you've always dreamed of building.

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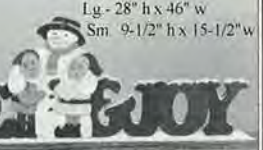


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# JAPAN

## A YEN FOR SLOW GROWTH

After two or three years of bondage, these Japanese cedar trees will display evidence of the favored crinkle figure called *shibo*.

Roughly the size of California, Japan enjoys forest reserves on 68 percent of its land, yet the country imports 70 percent of its wood supply. Why? Because to the Japanese, beauty still ranks as the most important aspect of wood. And in Japan, wood beautiful enough to use in time-honored fashion can't be hurried to maturity.

Even with today's emphasis on technology and concrete-and-steel construction, the tradition-minded Japanese who can afford a wood home insists on *sugi,* a cedar, and *hinoki,* a cypress, for interior millwork and trim. To create the poles of polished, figured sugi that define the *tokonoma* (place of honor) in a Japanese household, foresters wrap 20-year old trees in colored plastic or with bambo poles and elastic cords. This eventually imprints *shibo,* a crinkle figure, in the wood grain and makes the wood more desireable at harvest. Such a post, when dimensioned to 4×4×13', may be worth as much as $7,000!

To satisfy less wealthy buyers, sugi is sliced into thin veneer, and then applied to imported Douglas fir or pine timbers. The Japanese prefer even a veneer of their favored wood over a solid timber of any imported species. To replace the native hinoki, once represented by vast forests felled during the Second World War, the country imports a similar cypress species from Taiwan and Southeast Asia.

Other species have their historic place, too. There's *keyaki,* a hardwood that looks like elm, for cabinets and house construction. *Tsugu,* a yellowish spruce, dominates home frameworks. For roof beams, carpenters look to *akamatsu,* a red pine. *Kashi,* an oak, becomes cabinets and household implements. Purely decorative elements, such as trim, can be made of *momiji,* a maple. *Kiri,* called royal paulownia in the U.S. where it has become naturalized, has always been made into boxes for storing precious contents. That's because it swells airtight in the island nation's dampness. And finally, there's *kuwa*, a mulberry that's hard, durable, and perfect for handles and door pulls.

Illustration: Jim Stevenson

# What it takes to cut it as a Consumers Digest Best Buy.

You don't get named a *Consumers Digest* Best Buy without working at it. You have to be an *outstanding* value. That's the Dremel 1671 Scroll Saw.

The Dremel 1671 has a lot of features that make it a pleasure to use. It has two cutting speeds and a powerful motor that lets you buzz through wood up to two inches thick, as well as sheet metals and plastics.

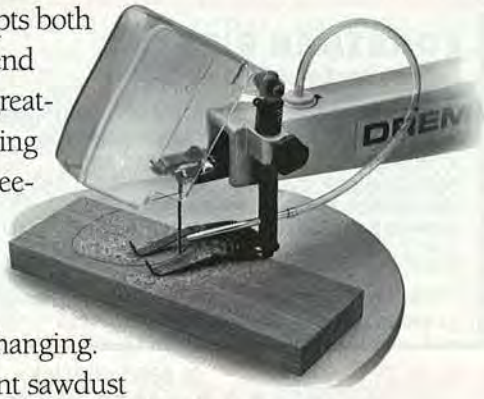
The sturdy, 12-inch cast aluminum table is adjustable from 0° to 45° for accurate bevel cuts up to 1-inch thick.

Of course, not all the features of the Dremel 1671 Scroll Saw are as obvious. A special mechanism quickly stops cutting action if the blade breaks. And the heavy cast-iron base keeps vibration to a minimum.

So if you're searching for the perfect scroll saw for your craft or other woodworking projects, check out the Dremel 1671.

A 16-inch throat and the ability to cut from both the front and the side, means you can handle large work pieces.

The saw accepts both plain- and pin-end blades, for the greatest possible cutting versatility. The see-through blade guard pivots out of the way for easy blade changing. And a convenient sawdust blower keeps your cutting line clear for accurate cuts.



And see why *Consumers Digest* placed it a cut above the rest.

For a free copy of the *Dremel Scroll Saw Blade Application Guide* write to: Dremel, Dept. S-W, P.O. Box 1468, Racine, WI 53406-1468.

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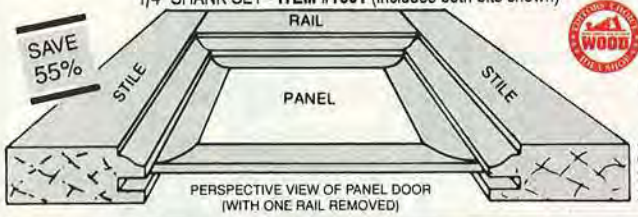


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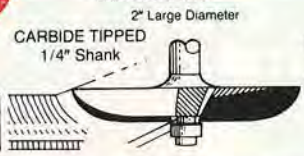


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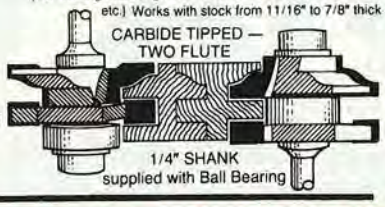
(For making matching rails and stiles in raised panel doors, etc.) Works with stock from 11/16" to 7/8" thick

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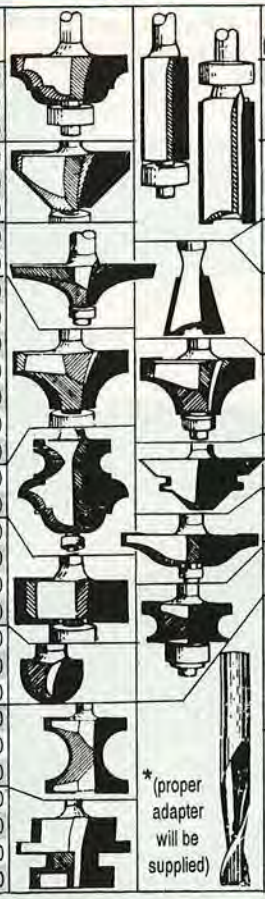


| ITEM NUMBER | DESCRIPTION (ALL 2 FLUTE) | SHANK SIZE | PRICE |
|---|---|---|---|
| #1337 | FLUSH TRIM - 3/8" Diameter — 1" Cutting Length | 1/4" | $ 7.50 |
| #1338 | FLUSH TRIM - 1/2" Diameter — 1" Cutting Length | 1/4" | $ 8.00 |
| #1339 | FLUSH TRIM - 1/2" Diameter — 1-3/16" Cut. Length | 1/2" | $ 8.00 |
| #1340 | PATTERN / FLUSH TRIM - 1/2" Diameter | 1/4" | $15.00 |
| #1341 | PATTERN / FLUSH TRIM - 3/4" Diameter NEW ! | 1/4" | $17.00 |
| #1342 | PATTERN / FLUSH TRIM - 3/4" Diameter | 1/2" | $19.00 |
| #1343 | KEYHOLE CUTTER - 3/8" (bit not | 1/4" | $ 8.50 |
| #1344 | KEYHOLE CUTTER - 1/2" shown) | 1/4" | $ 9.00 |
| #1345 | DOVETAIL (HSS) - 1/4" Diameter — 7-1/2° | 1/4" | $ 6.50 |
| #1346 | DOVETAIL - 1/2" Diameter — 14° NEW ! | 1/4" | $ 6.00 |
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| #1348 | BEADING - 1/4" Radius | 1/4" | $13.00 |
| #1349 | BEADING - 3/8" Radius | 1/4" | $15.50 |
| #1350 | BEADING - 1/2" Radius | 1/4" | $17.00 |
| #1351 | LOCKMITRE - 7/8" Cutting Length NEW ! | 1/4" | $32.00 |
| #1352 | LOCKMITRE - 1-1/8" Cutting Length | 1/2" | $45.00 |
| #1353 | OGEE RAISED PANEL - 2" Large Diameter | 1/4" | $28.00 |
| #1354 | OGEE RAISED PANEL - 2-3/4" Large Diameter | 1/2" | $32.95 |
| #1355 | EDGE BEADING - 3/16" Diameter of Circle | 1/4" | $15.00 |
| #1356 | EDGE BEADING - 5/16" Diameter of Circle | 1/4" | $15.50 |
| #1357 | SPIRAL UPCUT - 1/8" Diameter (solid carbide) | 1/4"* | $ 9.00 |
| #1358 | SPIRAL UPCUT - 1/4" Diameter (solid carbide) | 1/4" | $12.00 |
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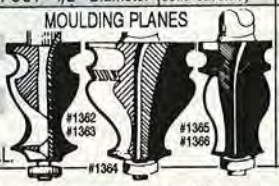
| #1366 | 1-11/16" C.L. | 1/2" | $31.95 |

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# YELLOW POPLAR

## The do-everything wood that's priced right

Ask a forester familiar with eastern hardwoods about yellow poplar, and he'll talk about tuliptree. And when a New England architect specifies whitewood, he most likely means yellow poplar. Talk to a lumberman about yellow poplar, though, and you'll both speak the same language because this tree represents the most valuable commercial species of the eastern forests.

Even before the first settlers arrived, New York's Onondaga Indians were very familiar with "the white tree." From its easily worked pale wood, they made canoes and utensils. When colonists arrived, the newcomers learned to craft what they soon called yellow poplar into everything from berry baskets and boxes to trim and furniture.

Today, the wood remains just as versatile. No other species can match yellow poplar's variety of uses. It becomes construction lumber, moldings, plywood cores, drawer sides, matches, piano and organ actions, containers, paper, woodenware, furniture parts, and even caskets.

### Wood identification

Yellow poplar (*Liriodendron tulipifera*) shares the family tree with magnolia. But because of its relatively soft wood, a trait that resembles the true poplars like eastern cottonwood and the aspens, it long ago gained association with these trees.

Growing to its greatest size in the southern Appalachian Mountains, yellow poplar reaches heights of 150' and diameters greater than

8'. Frequently, these forest trees will be clear of branches for the first 80' to 100'!

In its range, yellow poplar prefers to grow singly among pines and other hardwoods, rather than in pure stands. But you'll have little trouble recognizing this tree. The sometimes 2"-thick, gray-brown bark of mature trees has deep furrows between its ridges. Summer brings yellow poplar's greenish-yellow, tuliplike blooms among the tree's glossy, saddle-shaped leaves. In winter, yellow poplar's inedible, conical fruit remains on its branches.

At about 28 pounds per cubic foot dry, the wood of yellow poplar weighs two-thirds as much as black walnut. It's also about half as strong and hard. However,

Natural range

the medium-textured wood is straight-grained.

Although the yellow poplar sapwood has a creamy tone, its heartwood ranges in color from tan to gold, often with streaks of blue, gray, and purple. These highlights make up for the wood's otherwise plain grain.

### Uses in woodworking

With strength sufficient for most projects, good stiffness, stability, and wear resistance, it can become furniture, trim, toys, and cabinets. For bowls and treenware, it carries no odor or taste. Unless you're going to paint your project, though, limit yellow poplar's use to indoors.

### Availability

Abundant throughout its eastern range, yellow poplar becomes less available farther west. Where you find it, expect widths up to 20", thicknesses to 3" or more, lengths to 16', and a cost of about $2 per board foot, even when surfaced. Only lumber is sold.

*Continued*

# PERFORMANCE PROFILE

# yellow poplar

***(Liriodendron tulipifera)***

Yellow poplar sapwood

Yellow poplar heartwood

Some woodworkers prefer the often striking colors of yellow poplar's heartwood. (Deep blue or purple streaks indicate mineral stains, a coloration that does not harm the wood.) If you prefer less colorful variation in your stock, specify sapwood or pick through the boards at your supplier for those of uniform tone.

## Machining methods

Yellow poplar means good news if you like to work wood with hand tools (or would like to learn). It's kind to cutting edges, bits, and abrasives, so you can have some real fun project-building. But if power tools are your approach, keep the techniques in the box below in mind, and the following tips:

•Although yellow poplar isn't as hard as many other woods, it does have a tendency to burn. Use only sharp cutting edges.

•You also can avoid burning by keeping the stock (or the tool) moving at a constant rate. To hesitate allows the cutter to heat up enough to burn.

•Drilling hardwoods usually requires a slower rpm than drilling softwoods. With yellow poplar's tendency to burn, however, you'll want to speed up the process. And in thick wood, or with large-diameter bits, raise the bit occasionally to clear chips from the hole.

•Yellow poplar is a good wood on which to practice your hand-planing skills. With a finely honed cutter, it planes nearly as smooth as glass. Sanding produces equally fine results.

•In joining, the wood holds nails and screws quite well, and it takes all types of glues.

•Staining poses about the only finishing problem you'll have with yellow poplar. As its name implies, the wood does have a yellow (and sometimes green) cast. And the possible color variations in heartwood make results unpredictable unless you first test the stain on scrapwood of the same tone. Clear finishes may require a toner to balance the differing colors of the wood surfaces.

•Yellow poplar rates as about the most paintable wood around, especially with enamels. Water-based paints and clear finishes tend to raise a slight fuzz. A primer, followed by light sanding before the finish coat, will still produce a great look.

## Carving comments

The straight, even-grained wood of medium density won't threaten even beginning carvers. In fact, it's only a little harder than basswood, and holds details well. Note the finishing comments above though.

## Turning tricks

Whether you scrape or shear, yellow poplar shouldn't cause you any problems on the lathe. It's great for functional bowls.

### SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

*Any exceptions and special tips pertaining to this issue's featured wood species appear under headings elsewhere on this page.*

•For stability in use, always work wood with a maximum moisture content of 8 percent.

•Feed straight-grained wood into planer knives at a 90 degree angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15 degrees), and take shallow cuts of about 1/32".

•For clean cuts, rip using a rip-profile blade with 24-32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.

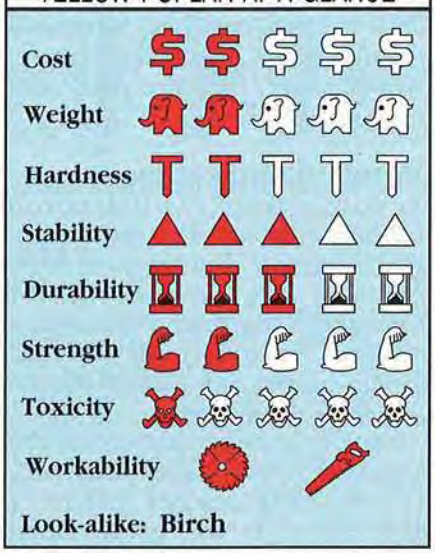
•Avoid using twist drills. They tend to wander and cause breakout. Always use a backing board under the workpiece to reduce wood tearout.

•Drill pilot holes for screws.

•Rout with sharp, preferably carbide-tipped, bits and take shallow passes each time to avoid burning the wood.

•Carving hardwoods generally means shallow gouge bevels—15°-20°—and shallow cuts..

### YELLOW POPLAR AT A GLANCE




Compiled with woodworkers Jim Boelling, Jim Downing, Chuck Hedlund Illustrations: Steve Schindler

Kansan Jerry Reinhardt and his parade of carved and painted animals bring back fond memories of America's captivating carousels

# MERRY-GO-ROUND MENAGERIE

"Like most people, I was a little shaver when I first rode a carousel. That was at Chicago's Riverview Park in the late 1940s. The drive to the city with my parents from our hometown in the cornfields took better than two hours in those pre-expressway days. But the experience was worth it. The huge horses were magnificently carved. Their coats of shiny bright paint and gilt flashed in the lights. And the strains that came from the carousel's grand band organ contributed to the fantasy world. As I remember, I had my favorite steed—a spotless white beauty bedecked with flags, stars, and ribbons. For turn after turn, I was Buffalo Bill drawing applause at

*Continued*

# MERRY-GO-ROUND MENAGERIE

**a roaring Wild West show. Today, Riverview is history. It closed in the 1960s. But its glorious carousel still goes around at Six Flags Over Georgia amusment park near Atlanta.**

**One of the 160 or so active wooden carousels in North America preserved intact by amusment parks, cities, or museums, the former Riverview merry-go-round reigns as monarch of yesteryear. Created by the Philadelphia Toboggan Co. (which made roller coaster rides, called toboggans back then) in 1908, the 69-horse, 40-ton machine is carefully maintained to provide memories for an untold number of youngsters, and to revive them in adults. Thanks to the caring members of the National Carousel Assoiciation (see *page 27*), who work to faithfully preserve the remaining wooden carousels around the country, there are still many memories to be made."**

Peter J. Stephano

Senior Editor

During the 60-year period from the 1870s to the 1930s, 6,000 or so carousels were manufactured in the United States. Today, however, only a few percent of them survive.

Why were they so popular? And what happened to them all? Jerry Reinhardt knows. He carves miniature replicas of historic carousel horses and other animals—as well as restores full-size ones—at his home in Stilwell, Kansas, and the 60-year old has a deep fascination with their story.

"First of all, carousels were real moneymakers. At five cents a ride, a carousel owner could pay off the cost of a machine in the first year," says the lanky Kansan. The excitement in his voice hints that there's a lot more to come.

"Why, on a good summer Sunday, a carousel could take in $250—that's five thousand riders." Jerry pauses to cut a detail with a V-tool in the basswood animal before him. "And the bigger and prettier the carousel, the more people it drew.

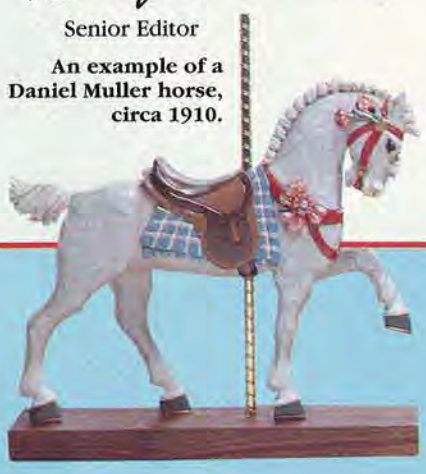
"The trouble was," he continues, "carousels took a beating. The legs, ears, and manes of the wooden horses and other animals got broken off. Then there was the weather—tough on the paint. So, without regular maintenance and refurbishing, they fell apart. If the cost of fixing one up got too high, the owners tossed it out or burned it! Especially the portable carnival carousels that traveled from town to town—they were built to last only about five years."

## An era of standers, prancers, and jumpers

According to Jerry, the heyday of carousels was a romantic time, literally. "Carousels provided the opportunity for a young, courting couple to get close, yet be proper," he says, smiling. "The gentlemen had to help his lady up onto the horse, then perhaps put his arm around her for steadiness. In those times, that was daring!"

When most people think of carousels, they see an image of children riding horses going up and down as well as around. Says Jerry, "Many carousels had horses called standers with maybe three of their feet planted. Then, there were jumpers that went up and down. Horses that stood still but had two front legs raised were called prancers.

"The horses had different head positions, too. Looking up, they're called stargazers. Then, there are tucked heads, and ones that stretched forward as if in wild gallup." (See photos on *preceding page* and *below*.) And it was how this mixture was placed on the carousel that made it an eye-catching attraction.



**An example of a Daniel Muller horse, circa 1910.**

**The wild style of this horse identifies it as a C. W. Parker creation, circa 1914**

**Gustav Dentzel carved the original of this horse in 1920.**

Because carousels were round, placing the animals took planning and a sense of showmanship. What type and size of horse as well as its head and leg position to use at a specific location was dictated by the size of the carousel. That's because each section of the circular carousel was pie-shaped, and the rows of horses had to fit into it. A three- or four-row machine, for example, would have larger horses on the outside row than a two-row machine. On the inside row were the smallest horses.

Then there was showmanship. "American carousels always went around counter-clockwise [in England, the reverse was true], so the right sides of the animals were highly decorated, sometimes with jewels and always with more elaborate carving," Jerry explains. "And most heads turned slightly to the right, with the manes in full view of onlookers.

"In the second and third rows, they usually placed the stargazer horses, because their heads would show," he continues. "The jumpers were in the inner rows, too, often placed so that their action could be seen through the outer horses as the unit turned."

A carousel buff like Jerry also knows that there's a beginning to a carousel, even though it's a round machine. "The ticket taker had to know where to start and where to leave off," Jerry says, glancing at the nearly completed horse on the workbench. "So every carousel had a lead horse on the outside row that was the fanciest on the machine. On the opposite side of the carousel was a horse almost it's equal, just for visual balance."

## Yesteryear's master carvers live on in miniature

Jerry hung up his naval aviator's wings 19 years ago after 23 years of service. In the Navy, he'd always carved for relaxation no matter what country he found himself in. Back then, though, he had a fondness for simple caricatures in a folk-art style.

In retirement back home in Kansas, Jerry became a building contractor, but never gave up carving and even joined the Kansas City woodcarving club. It was only about 15 years ago, though, that he got into carving carousel horses.

"I was looking for something that I could carve and sell at the Bonner Spring's Rennaisance Fair, because everything there has to be from that period," recalls Jerry. "Looking through the encyclopedia, I discovered that carousels came from medieval times. Rough-carved wooden horses were placed on a merry-go-round affair to enable young knights to train for combat! So, I carved a few little horses and stuck them on poles, and they sold!"

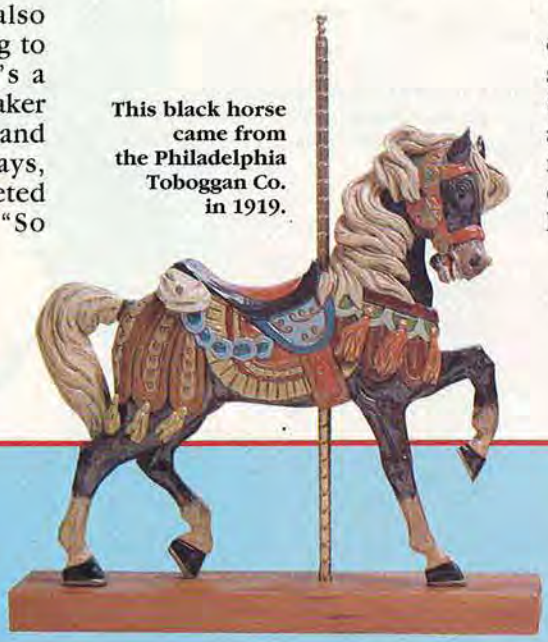
**Because carousels often had other animals besides horses, Jerry carves lions, tigers,and even ostriches in miniature.**

Demand for Jerry's carousel horses grew from there, and his interest in them matched the pace. Now, he prides himself on their faithful detail. The fact that he gave up the contracting business 12 years ago and has always had at least a six-month backlog of orders shows that buyers appreciate his work.

Although his horses (he also does carousel menagerie animals, as shown above, but all sell for about $400) stand only 11" high, they're as masterful as the full-sized originals. And like the aircraft types he once could recognize just by silhouette, he knows the origin of a

*Continued*

**This prancer is a Spillman from about 1910**



**This black horse came from the Philadelphia Toboggan Co. in 1919.**

**This tan horse copies a Stein & Goldstein lead horse of 1917**

carousel horse by its shape and style of carving.

For instance, Gustav Dentzel, a turn-of-the-century master carver for the Philadelphia Toboggan Company, made realistic horses with elegant harnesses and trappings. Charles I.D. LOOFF carved elaborate, jewel-bedecked animals for the then-infant Coney Island in New York, and his flamboyant work came to be called the Coney Island style.

As the large, permanent carousels found in the cities grew in number, the demand rose for traveling ones that could visit rural areas. So, in the late 1800s, a smaller type of carousel horse was developed for portable merry-go-rounds. These country fair-style horses were produced first by the Armitage/Herschell Company of Tonawanda, New York. Then, not far behind, came the "Carry-Us-All" carousels of the C.W. Parker Company of Abilene, Kansas. At first, Parker copied the horses of Armitage/Herschell, but then developed his own style in 1906. By 1914 the Kansas company had a newer style with wild manes, flaring nostrils, and a stretched look. Naturally, there's more to the carousel carvers' hall of fame than can be mentioned here.

## Basswood beauties from merry-go-rounds of history

In the old days, carousel carvers made their animals from wood that was locally plentiful. Some carved them in yellow poplar, some in pine, some in basswood. Even willow and cottonwood were used. Often, several woods ended up in the same horse because the bodies weren't one-piece, and many were hollow. Jerry, though, carves his solid, and he prefers basswood, air-dried.

"In fact," Jerry points out, "one carver seldom did an entire horse. Instead, several carvers worked on different parts according to their skill level. The head was left to the best carver. That's where the term *head man* came from."

Jerry's small-scale horses (they're about 1½" to 12") originate from photographs that he takes on location. Or, if the horse is a commission, he'll work from photos that the buyer furnishes. From the photos, Jerry scales out a pattern on paper, then traces it onto a basswood blank, which he saws to shape at the bandsaw. Next comes more sawing, but with a coping saw, as he removes the wood between the legs. From there on, the carving remains on Jerry's workbench until he cuts in the final details with a V-tool or carving knife.

"Now, in a good week, I do three carvings," Jerry comments, turning the nearly finished horse. "And Marilyn, my wife, does all the painting. But I remember when it took me three weeks."

From removing wood with a saw instead of carving it, to the elimination of handsanding (see photos left and below), Jerry has learned efficiency. And one of his lessons came from naval duty in the Phillipine Islands.

"I was up in the mountains of Luzon watching native carvers work a whole log," Jerry recalls,

**Each carousel animal receives a final sanding with the 180-grit abrasive of a fine-fingered flap sander mounted in Jerry's electric drill.**

**Jerry does some of his sanding with a 1" square of Scotchbrite abrasive chucked into a Foredom power carver.**

his voice reflecting the vividness of the memory. "They were Igorots—ex-headhunters—and they carved with tools made from car leaf-springs. Well, they didn't use clamps, but instead, they had ropes wrapped around the log with a treadle board attached to them. When they needed to work on a different part of the log, they hopped off the board, turned the log, then got back on the board. Years later that I figured out that with ropes and a treadle board, you could hold odd-shaped workpieces." (See photo, *right.*)

**Rope "clamps" secured to and tightened by a treadle board beneath the bench allow Jerry to steady irregular shapes as he carves.**

## The color and glitter of a carousel out of a bottle

Several years ago, Jerry asked Marilyn if she would mind painting some solid areas on a couple of horses. Now, she's in charge.

After referring to photos, Marilyn gives the carousel horses their authentic coats in artist's acrylics. First, though, Jerry sprays on a seal coat of flat white lacquer. "There's nothing like a base coat to indicate where a little more sanding, cleaning, or even filling needs to be done," he notes.

Then, after Marilyn's paint job, each horse receives spray coats of Deft, making it glisten as if it were ready for the carousel's first ride. Oh, those were the days.

### Interested in carousel carving?

To find out more about Jerry's carousel carvings, drop him a line (please include a self-addressed, stamped business-sized envelope) at:
**Carousel Woodcarvings, 18770 Metcalf, Stilwell, KS 66085.**

## Painted ponies prance on

The National Carousel Association was founded in 1973 in Sandwich, Massacusetts to "promote the conservation, appreciation, knowledge, and enjoyment of the art of the classic wooden carousel, and especially the preservation of complete wooden carousels." Today, it numbers over 1,000 members, and has helped preserve and restore old carousels around the nation. For information, write:
**National Carousel Association, Terry I. Blake, Exec. Sec., P. O. Box 4333, Evansville, IN 47724-0333.**

Written by Peter J. Stephano  Photographs: Bob Hawks

**In her basement painting room, Marilyn adds historically accurate colors to Jerry's carved animals with acrylic paint. Note her reference photos.**

# ON-THE-MONEY
## HERE'S HOW TO CUT 'EM AND CLAMP 'EM

### First, a few definitions

Simply put, we refer to any two workpieces as being mitered if they join at an angle and have angled mating surfaces. Although most woodworkers think of a miter joint as two workpieces meeting at a 90° angle, that's not always the case, as with a pentagon, hexagon, or other shape with more than four sides. In this article we'll deal with simple miters that require *either* a bevel or miter cut, but not both as found in a compound miter.

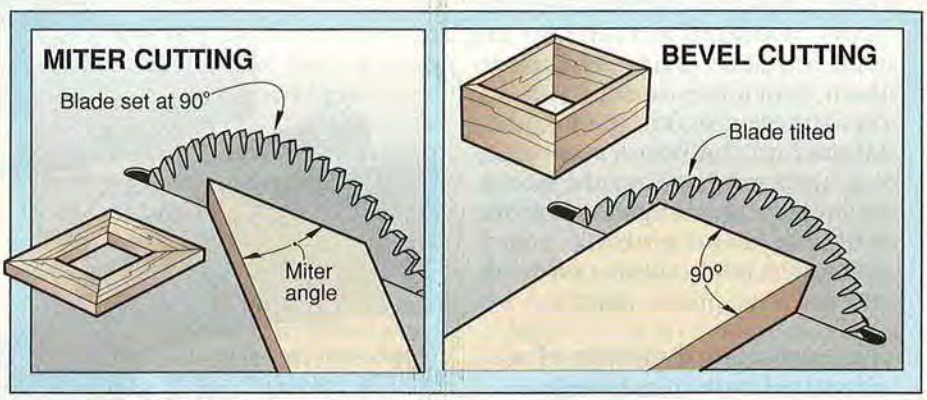
You go about cutting these angles by either *miter-cutting* or *bevel-cutting* the workpieces. As shown *above,* to make a miter-cut you angle your workpiece and set the saw blade 90° to the saw table. To bevel-cut a workpiece, you tilt the blade to achieve the necessary cutting angle. You'll miter-cut workpieces for projects such as picture frames and clock face frames. With bevel-cut workpieces, you construct projects such as planters, columns, staved bowls, kaleidoscopes, and other turned objects.

### How to determine the miter angle

Depending on your project, you'll determine the cutting angles by either *plan-as-you-go* or *preplanning* them. Here's a look at how and when you use each method:

The plan-as-you-go method works when attaching moldings to surfaces such as the perimeter of a tabletop, or the walls of a room. These surfaces often have corners with inexact angles, so you plan and cut each piece separately.

For each corner, you need to measure and determine the *joint angle* as shown in the 3-step drawing *right*. Then, divide the joint angle in half to determine the *miter angle*.

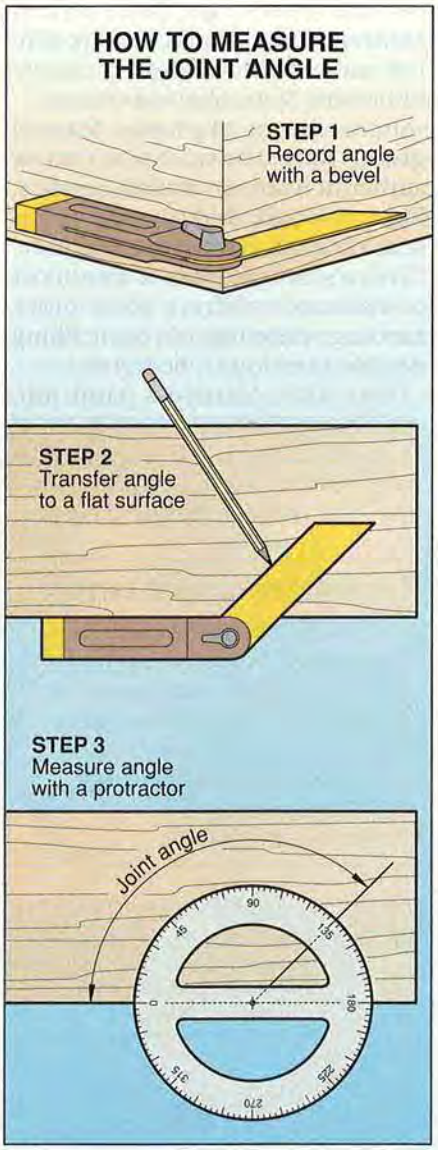



To attach the moldings, first cut each molding about 1" longer than its finished length toe to toe. Then, miter one end of a workpiece and put it into position. Miter the end of a mating workpiece and check the miters for fit. If they don't fit precisely, you can either reset your cut angle slightly and recut them or sand away the excess material from the mating workpiece on a disk sander as shown *below.*

**When removing excess material with a disk sander, mark the joint so you don't remove too much.**

Mark the *heel* on the unmitered end of the workpiece as shown in the photo on the *next page,* and make a miter cut at this point. Repeat this process around the perimeter of your project.

The preplanning method works when you're building a multisided project, such as a picture frame, that doesn't have to fit around another framework. In these situations, you plan all of the miter cuts before cutting them, using





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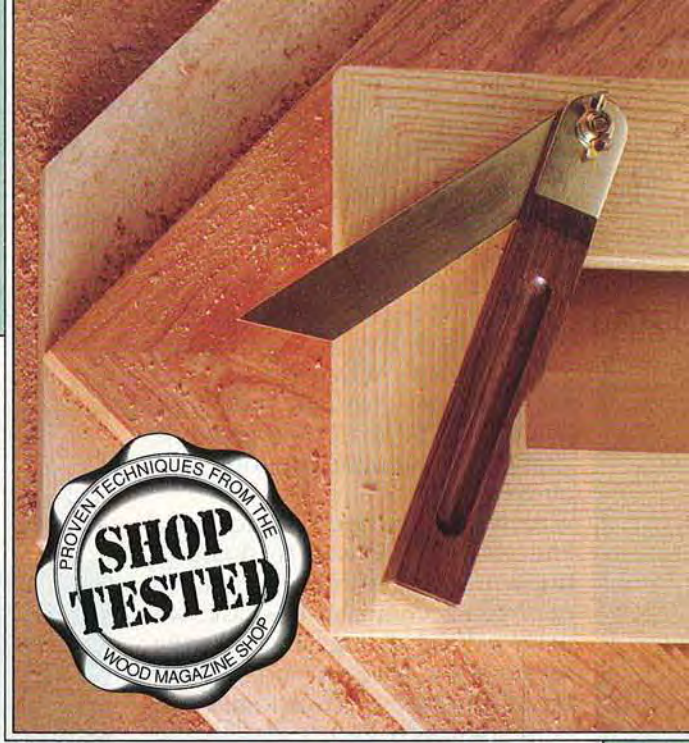
# MITERS LIKE A PRO




| AT-A-GLANCE LOOK AT MITER ANGLES FOR MULTISIDED PROJECTS | | |
|---|---|---|
| 4 Sides<br>45° Miter | 5 Sides<br>36° Miter | 6 Sides<br>30° Miter |
| 8 Sides<br>22.5° Miter | 10 Sides<br>18° Miter | 12 Sides<br>15° Miter |

the formula: ***miter angle = 360° ÷ number of sides ÷ 2.*** For example, in building a square frame, the miter angle would be 360° ÷ 4 ÷ 2 = 45°. We did this calculation for six common shapes; you'll find their miter angles in the chart *above.*

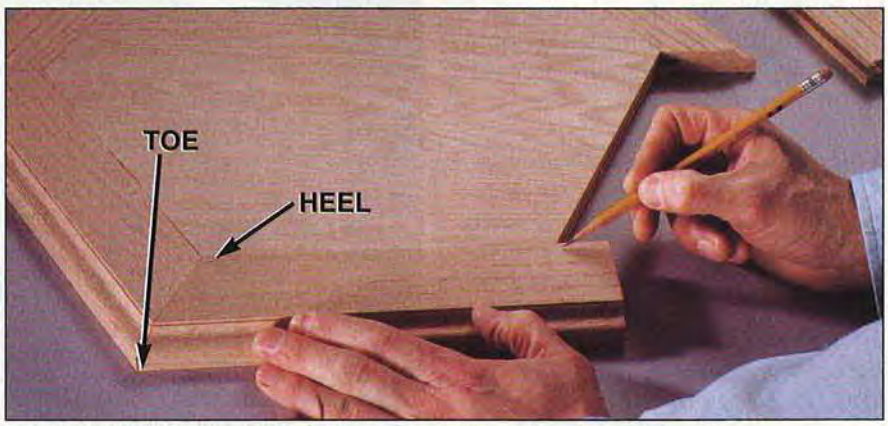
## Make a cutting diagram for miter-perfect results

Your mitered workpieces will look best if the grain pattern appears to run continuously from one joined piece to the next. So with the plan-as-you-go method, attach the moldings in the same order that you cut them.

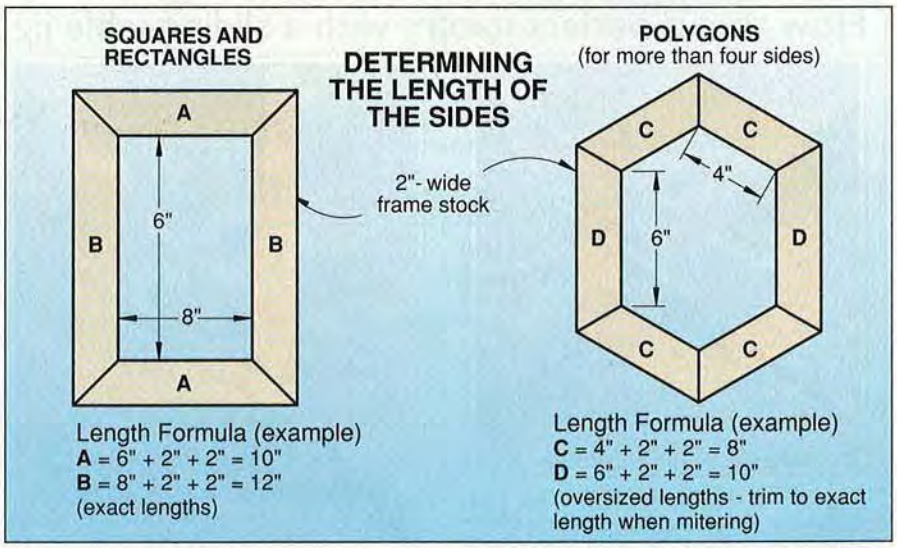
With the preplanning method, you first calculate the length of each side as shown *right*. Keep in mind the width of the frame's rabbet, and calculate the inside dimensions of the frame so that your picture fits snugly into the rabbeted opening.

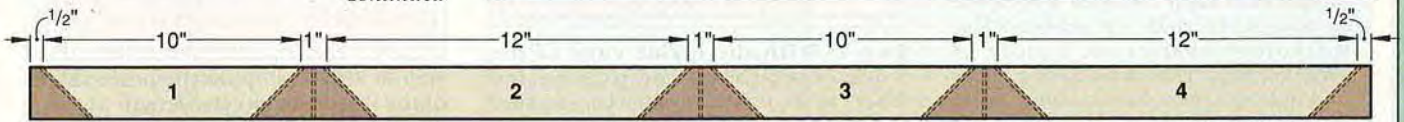
Now, you can make a cutting diagram like the one *below*. With this diagram completed, transfer the cutoff marks to your workpiece, and number the workpieces so you can reassemble them in the correct order later.

*Continued*




**Mark the heel of each workpiece to accurately guide your miter cut.**




**Cutting Diagram**

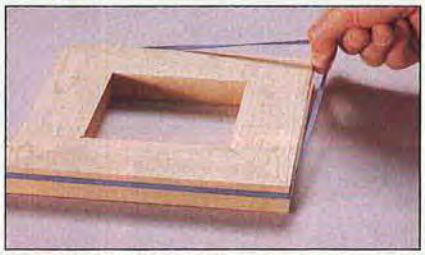
# ON-THE-MONEY MITERS

## The keys to quality miter cuts

You can use several tools to cut miters: a tablesaw, radial-arm saw, power mitersaw, or a miter box and handsaw. Whatever tools or method you choose, your saw blade must be sharp and properly aligned for straight, smooth, and chip-free cuts.

Likewise, you need an accurate and rock-steady way to position the workpiece during the cut. To help you accomplish this task, we designed the sliding-table miter jig on *page 34*. (See the box *below* for information on how to use this tablesaw-based jig.) If you would like to build a similar, but simpler, jig for cutting 45° miters only on a tablesaw, try the version presented on *page 16*.

***Note:*** *Before making cuts in your actual workpiece, check the accuracy of your cuts on short lengths of scrap stock. To do this, cut all the sides of your project and hold them together with a rubberband as shown* above. *Then, make any necessary adjustments in the cutting angle of your saw.*

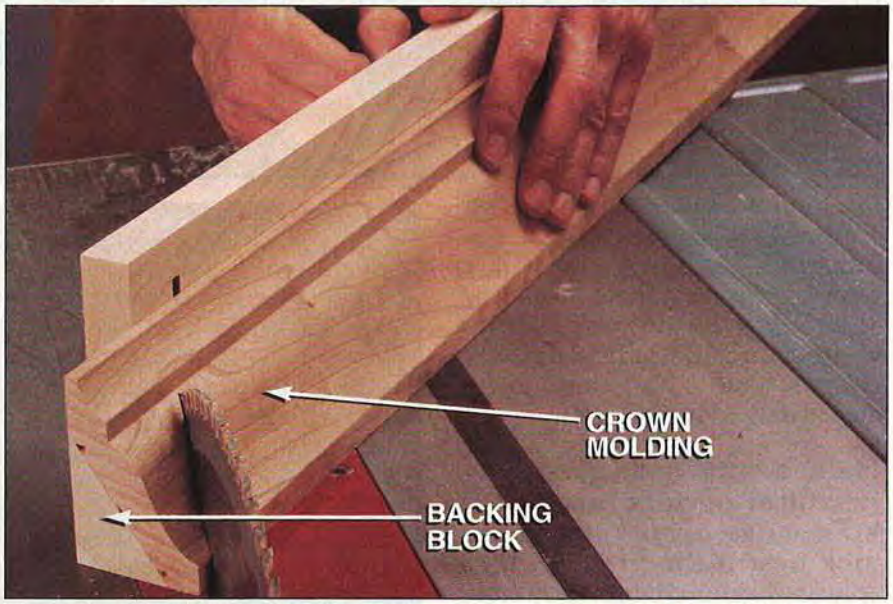


**A rubberband holds your test pieces together to help you determine the accuracy of your cuts.**

## How to miter wide workpieces

Depending on your tablesaw, you may not be able to use the miter jigs described in this issue on *pages 16* and *34* for cutting wide workpieces. Here we'll share two examples of such instances, and how we tackled them.

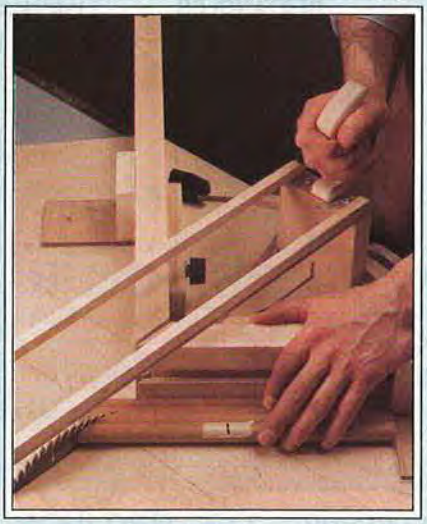
Since the blades on most 10" tablesaws only project 2⅜" above




**Use a miter gauge and backing block to make simple work of crown-molding cuts.**

## How to cut perfect miters with a sliding-table jig

**Step 1: Set the jig for a 90° cut, and crosscut the workpieces about 1" longer than their finished length toe to toe. Note that we marked the workpiece number on a piece of masking tape. This saves us the effort of sanding a penciled number from the intricate molding.**



**Step 2: With the inside edge of the workpiece against the jig's angled fence, make the first miter cut. Be sure to cut the workpiece about ½" too long.**

**Step 3: Set the stop on the other side of the jig for the precise length of the workpiece, and cut the other miter.**

the top surface of a ¾"-thick sliding table, we lay workpieces wider than 2⅜" on their back face and bevel-cut them by tilting the saw blade (see photo *right*). To do this, we built a simple sliding cut-off table for 90° cuts like the one illustrated *right*.

Crown moldings pose another challenge. If you lay them flat on a fence or sliding table, you need to make a compound cut (angled *and* beveled). To simplify this operation, we glue a *backing block* to the molding, enabling us to make a simple miter cut as shown *left*. Because this molding (with backing block) stands more than 2⅜" high, we used a miter gauge and auxiliary fence to make the cut.

## Call in reinforcements for secure joints

Glue alone will not sufficiently bond most end-grain-to-end-grain joints, so you need to reinforce the joint in some way. The drawings *bottom* show you several methods for reinforcing a miter joint. The spline and biscuit reinforcements offer the greatest strength. The dowel and surface spline don't provide quite as much strength, but take little time to complete. (For more information on how to reinforce miters with splines, see the Oak Desk project in the August 1993 issue of *WOOD*.)

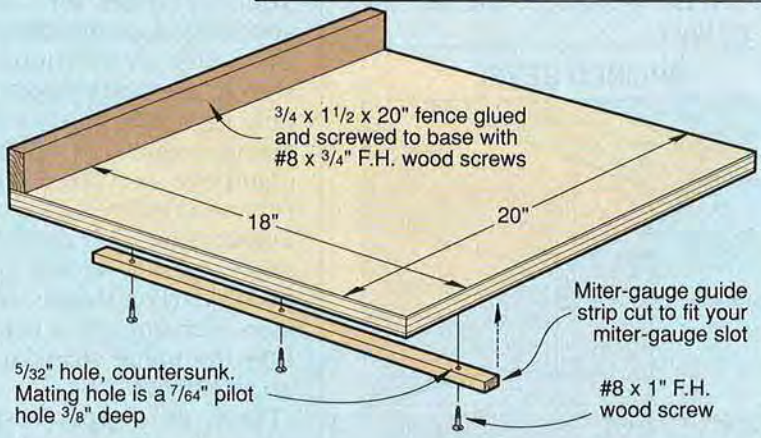
It's a good idea to spline the beveled mating surfaces of nearly any box as shown on the *next page*. Depending on the miter angle of the joint, you need to tilt your tablesaw blade so it cuts a slot that's perpendicular to the face of the joint. For example, for a square, four-sided box you adjust the blade to 45° and make the cut with the inside surface of the workpiece on the saw table.

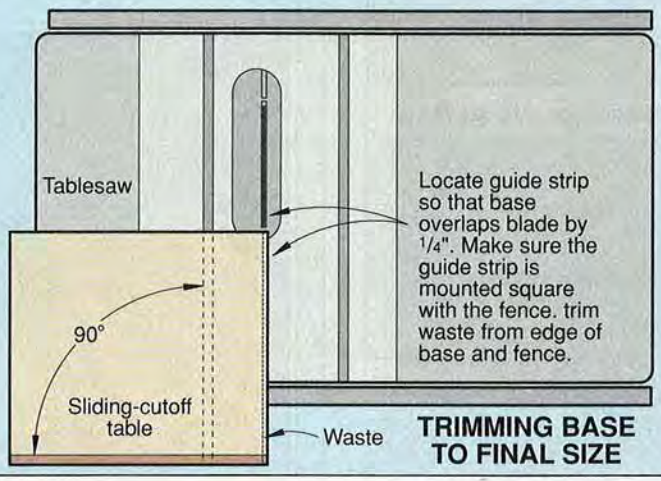
But, with projects with more than four sides you need to take a different approach. With these you set the blade at 90° and posi-

*Continued*

## Sliding cut-off table

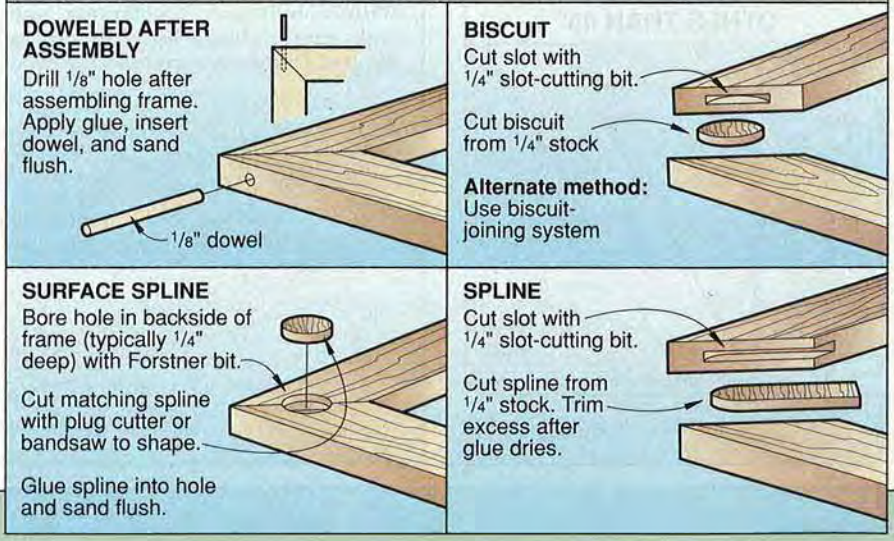
A simple sliding cut-off table helps you bevel-cut wide workpieces.


¾ x 1½ x 20" fence glued and screwed to base with #8 x ¾" F.H. wood screws
18"
20"
Miter-gauge guide strip cut to fit your miter-gauge slot
5/32" hole, countersunk. Mating hole is a 7/64" pilot hole ⅜" deep
#8 x 1" F.H. wood screw

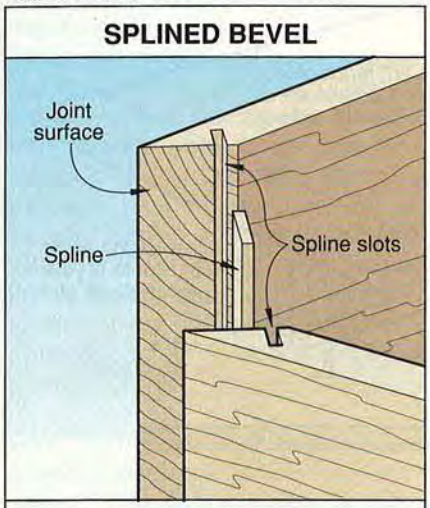

Tablesaw
Locate guide strip so that base overlaps blade by ¼". Make sure the guide strip is mounted square with the fence. trim waste from edge of base and fence.
90°
Sliding-cutoff table
Waste

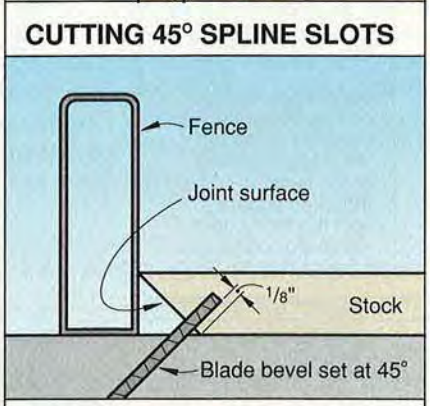
**TRIMMING BASE TO FINAL SIZE**

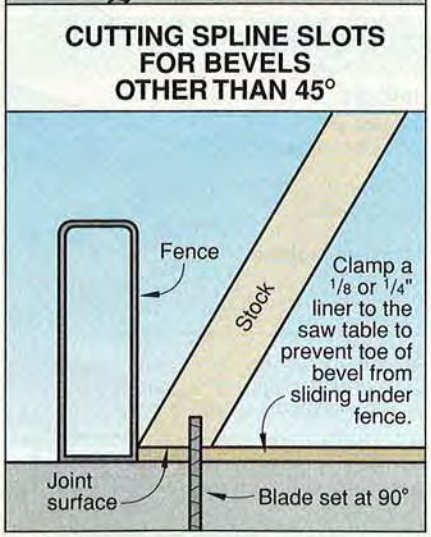
### MITER–REINFORCING OPTIONS


DOWELED AFTER ASSEMBLY
Drill ⅛" hole after assembling frame. Apply glue, insert dowel, and sand flush.
⅛" dowel
BISCUIT
Cut slot with ¼" slot-cutting bit.
Cut biscuit from ¼" stock
Alternate method: Use biscuit-joining system
SURFACE SPLINE
Bore hole in backside of frame (typically ¼" deep) with Forstner bit.
Cut matching spline with plug cutter or bandsaw to shape.
Glue spline into hole and sand flush.
SPLINE
Cut slot with ¼" slot-cutting bit.
Cut spline from ¼" stock. Trim excess after glue dries.

tion the face of the joint on the saw table with the toe of the joint against the rip fence. You shouldn't have a problem steadying workpieces under 3' long. For larger pieces, temporarily tack or clamp a supporting block between the workpiece and the saw table liner.





CUTTING SPLINE SLOTS FOR BEVELS OTHER THAN 45°
Fence
Stock
Clamp a 1/8 or 1/4" liner to the saw table to prevent toe of bevel from sliding under fence.
Joint surface
Blade set at 90°

## Try these tricks for clamping mitered workpieces

For as long as woodworkers have mitered workpieces, they have tried to come up with a better way of clamping them together. Today, you can buy an array of specialized clamps for this purpose, but we've found that the simple methods described here help us handle most situations:

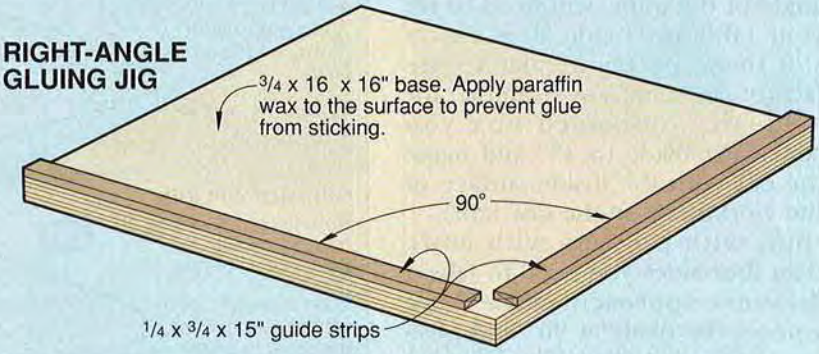
•Instant glue. For quick-and-easy clamping, we often use instant (cyanoacrylate) glues to bond miters. First, you need to build a simple gluing jig like the one at *bottom*. (For shapes with more than four sides, you need to position the guide strips at an angle greater than 90°.)

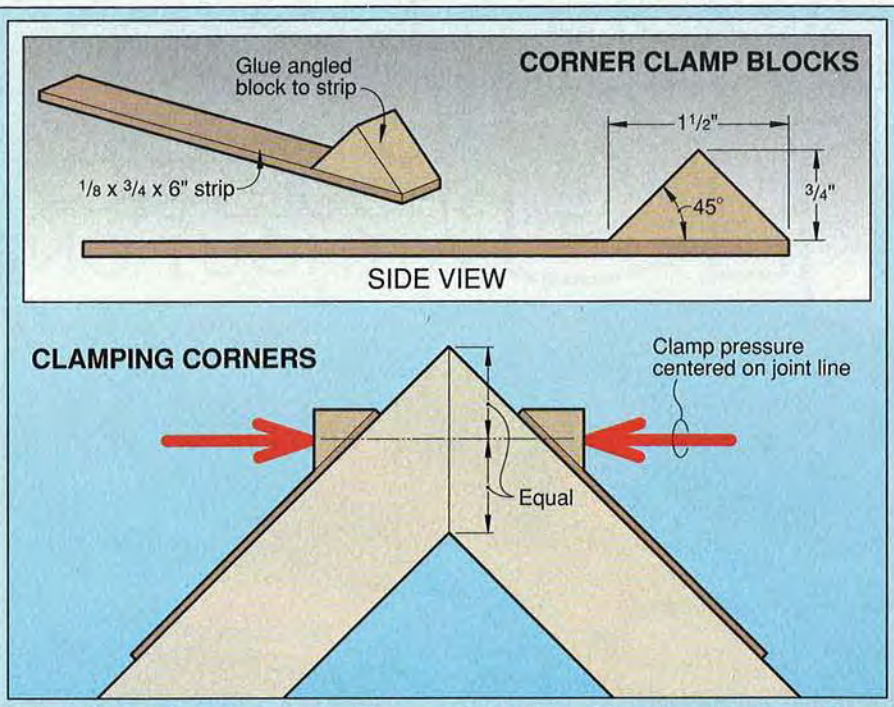
Then, you apply instant-glue accelerator (to speed curing) to one side of the miter, gap-filling instant glue to the other side of the joint, and hold the workpieces together for 5 to 10 seconds as shown *below left*. Excess instant glue requires considerable effort to sand away, so if possible avoid glue squeezeout. (For more information on instant glue, see the article starting on *page 62*. You can buy instant glue and accelerator at hobby stores nationwide. Or, call Garrett Wade at 800/221-2942 (orders) or 212/807-1155 (information).

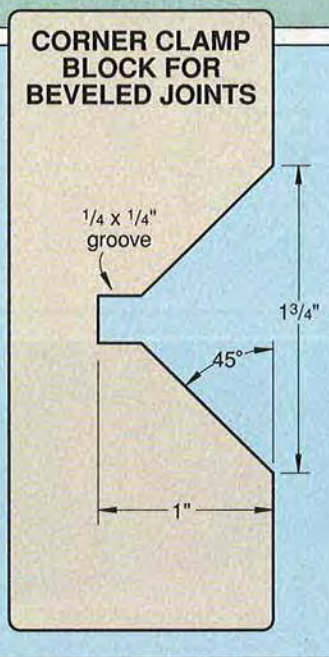
•**Clamp blocks.** Instant glues don't come cheap (about $10 for two ounces), so here's a method that works with woodworker's glue. First, build a set of corner clamp blocks (see drawing *near right*). Clamp one on the outside

**With instant glue, accelerator, and a right-angle gluing jig, you can join mitered frames in seconds.**

**Corner clamp blocks like those illustrated on the next page help your clamps snugly hold miters together.**


RIGHT-ANGLE GLUING JIG
3/4 x 16 x 16" base. Apply paraffin wax to the surface to prevent glue from sticking.
90°
1/4 x 3/4 x 15" guide strips



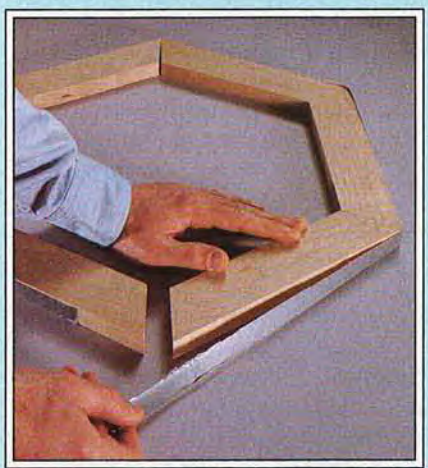

edge of each corner, apply glue to both sides of the joint, and use another clamp to bring the joint together as shown *left.*

**•Tape.** When pulling together frames with more than four sides, we usually wrap a strip of fiber-reinforced tape (such as duct tape or strapping tape) around the perimeter of the frame. With these tapes you can pull the joints tight without fear of the tape coming loose or breaking.

Start by attaching the tape to the outside edge of one piece. Then, butt the toe of this piece to the toe of an adjoining piece. Attach the tape to the edge of the second piece, and repeat this process until you tape all of the pieces together in a straight line. Now, apply glue to all of the mating surfaces, and pull the frame together as shown *left.*

**•Web clamps.** These handy devices prove themselves indispensable when clamping boxes with beveled edges. To clamp four-sided boxes, first make four clamp blocks from 2×4 stock as long as the joint. Cut grooves into the 2×4 as shown *top right.* Place one clamp block on each corner and secure them with web clamps as shown *middle right*.

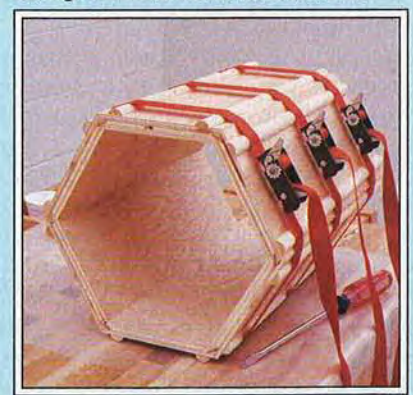
For boxes with more than four sides, use lengths of half-round stock in place of the clamping blocks (we sawed 1" dowel stock). As shown *bottom right*, these "chairs" prevent the web clamps from crushing the delicate corners on plywood stock.



**You can pull miters tightly together with fiber-reinforced tape.**

Written by Bill Krier with Jim Downing
Illustrations: Jim Downing; Kim Downing
Photographs: Hopkins Associates

**Use corner clamp blocks and web clamps to fasten four-sided boxes.**

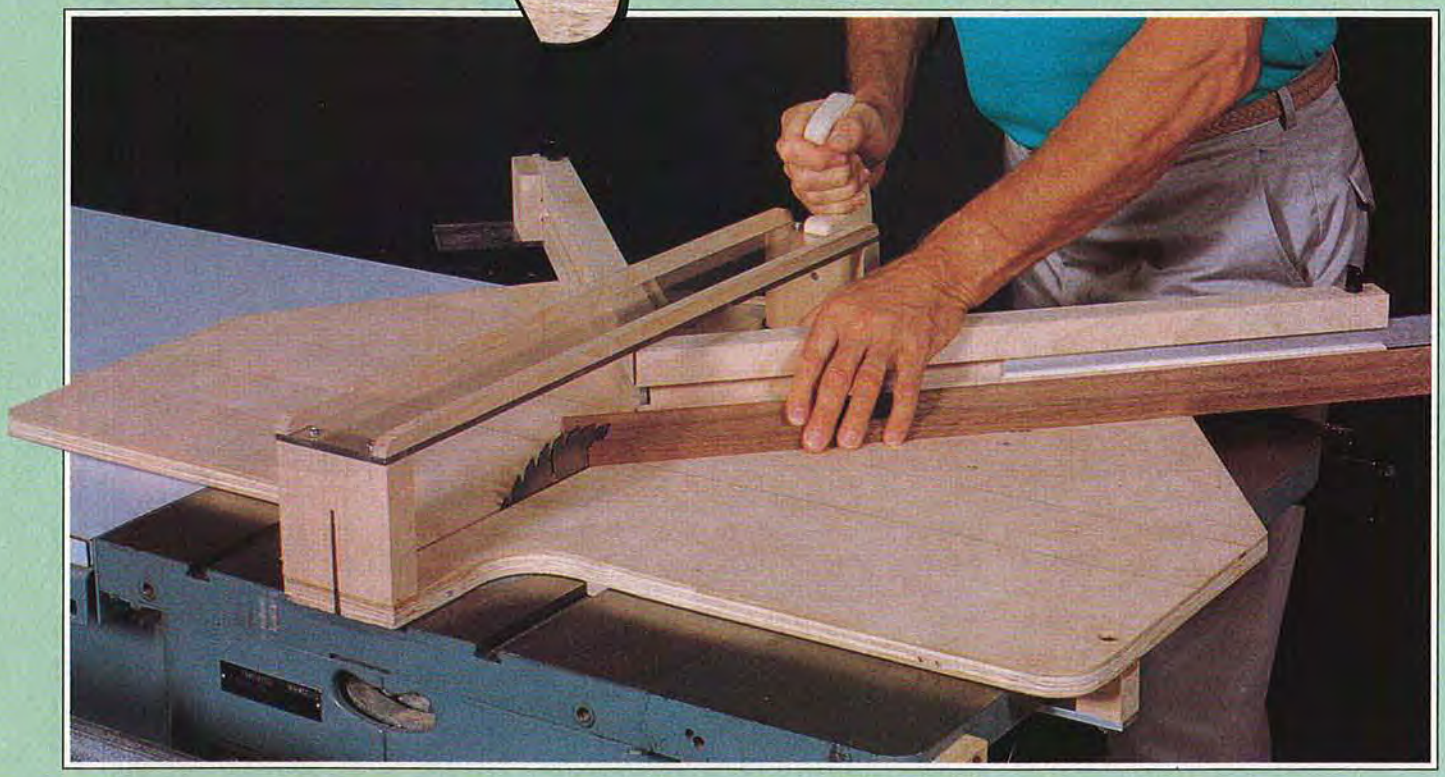


**Half-round "chairs" prevent the straps of web clamps from damaging delicate mitered corners.**

ANGLE-MASTER

# MITER JIG

## NO TABLESAW SHOULD BE WITHOUT ONE



To cut accurate miters each and every time without the hassle of making numerous test cuts to constantly verify our miter-gauge setting, we designed this practical jig for the *WOOD* magazine shop. And, boy, does it work! The main components included are the one-piece plywood BASE and the two FENCES with adjustable STOPS.

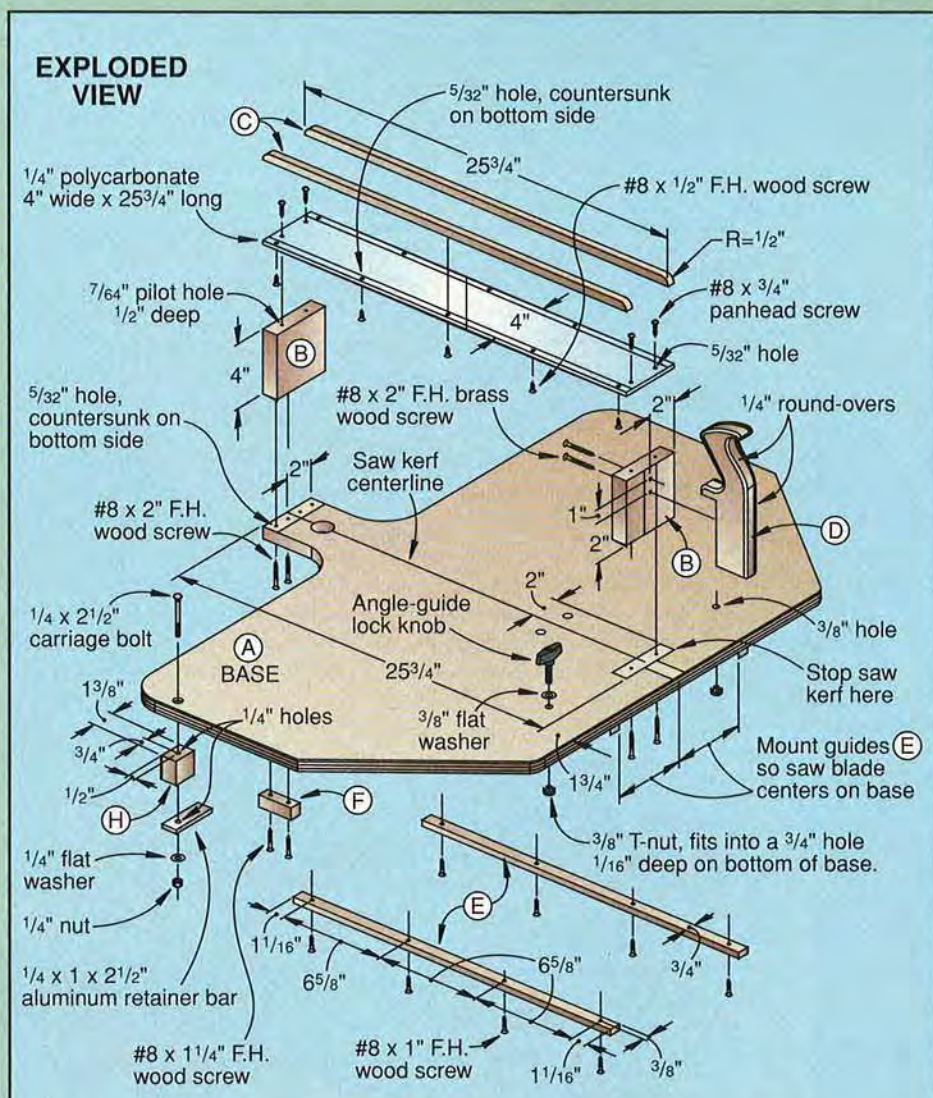
The pivoting twin fences allow us to cut both left and right miters without changing settings. Opposing fences are also necessary to miter-cut molded trim on both ends. Miter jigs with only one fence can perform this operation only on flat stock. In addition, these pivoting fences lock positively without a tendency to creep when tightening the lock knob.

The adjustable stops on the fences provide a range of miter-cutting pieces from 0 to 46" long. The polycarbonate STOP PLATES provide a positive stop for mitered ends of stock up to 4" wide. The locks on the aluminum stop bars provide "creep-free" positioning.

For safety, we used a POLYCARBONATE GUARD to provide a dust and chip-free view of the cutting action, and positioned the large PUSH HANDLE well above the blade height. We've also added a SAFETY STOP permanently attached to the side of the tablesaw extension to prevent the jig from moving too far forward and having the saw blade accidently cut through the rear support. Similarly, the sliding table support holds the jig on the table so it doesn't drop off the operator end of the tablesaw when pulled back.

Print this article

A. R. Downing, Design Editor — Jim Boelling, Project Builder




| Bill of Materials | | | | | |
|---|---|---|---|---|---|
| Part | Finished Size | | | Matl. | Qty. |
| | T | W | L | | |
| BASE ASSEMBLY | | | | | |
| A base | 3/4" | 27 1/2" | 40" | BP | 1 |
| B supports | 1 1/16" | 4" | 4" | B | 2 |
| C rails | 1/2" | 1/2" | 25 3/4" | B | 2 |
| D handle | 1 1/16" | 3" | 8 3/4" | B | 1 |
| E* guides | 3/8" | 3/4" | 22" | B | 2 |
| STOPBLOCK ASSEMBLIES | | | | | |
| F stopblock | 3/4" | 3/4" | 2 1/4" | B | 1 |
| G stop | 1 1/16" | 1 3/8" | 1 3/8" | B | 1 |
| H spacer | 1" | 1 7/16" | 1 3/8" | B | 1 |
| FENCE ASSEMBLIES | | | | | |
| I angle guides | 3/4" | 8" | 9 5/8" | BP | 2 |
| J fence supports | 3/4" | 2" | 7 3/4" | B | 4 |
| K fence | 1 1/16" | 3" | 26" | B | 2 |
| L fence retainers | 1/4" | 1 3/16" | 26" | B | 4 |
| M stop | 1 1/16" | 2 5/8" | 3" | B | 2 |

*Width of guides (E) determined by width of the tablesaw miter-gauge slot.

**Materials Key:** BP- birch plywood, B-birch

**Supplies:** 3/8" T-nuts, #8x3/4" panhead screws, #8x1/2" flathead wood screws, #8x3/4" flathead wood screws, #8x1" flathead wood screws, #8x1 1/4" flathead wood screws, #8x1 1/2" flathead wood screws, #8x2" flathead wood screws, #8x2" flathead brass wood screws, 1/4" nut, 1/4x2" carriage bolt, 1/4x2 1/2" carriage bolt, 1/4" flat washers, 3/8" flat washers, 1/2" dowel stock, 1/4x1" aluminum bar stock, brass floor flange toilet bolt trimmed to 2 3/8" long, 1/4"-thick polycarbonate for guard and fence stops, 6 threaded knobs.

## Start with the base

*Note: We built this jig to fit our 10" Delta Unisaw. The width of the base (A) may vary depending on your particular saw. The base should be wide enough to overhang the left-hand saw-table edge by 1 1/2", allowing enough room to attach the safety stops.*

**1** Using the dimensions on the Parts View drawing on the *next page*, measure carefully, and lay out the outline for the base (A) on a piece of 3/4×27 1/2×40" plywood (we used birch).

**2** Mark the centerpoints for all the holes shown on the drawing. Drill the holes to the sizes stated.

**3** Cut the base (A) to shape.

## Add a guard for safety

**1** Cut the front and rear supports (B) to size. Mark and drill a pair of countersunk mounting holes in one support for attaching it to the handle (D) later.

**2** Clamp the supports to the base where shown on the Exploded View drawing. Drill mounting holes, and screw (no glue) the supports to the base.

**3** Cut the guard top plate to size from 1/4" polycarbonate, using the dimensions on the Exploded View drawing. (Although 1/4" acrylic would work, we used polycarbonate because of its shatter resistance.) Mark the locations and drill and countersink mounting holes through the polycarbonate.

**4** Cut the two rails (C) to size. Drill mounting holes and screw them to the polycarbonate panel. Then, screw the polycarbonate panel/rails to the supports (B).

**5** Transfer the full-sized handle pattern to a piece of 1 1/16" stock, and cut the handle (D) to shape. Rout 1/4" round-overs on the handle where shown on the Exploded View drawing.

**6** Remove the guard (B, C, and polycarbonate plate) from the base. Clamp the handle to the guard. Using the previously drilled holes in the rear support as guides, drill 7/64" pilot holes into the handle. Screw the handle to the guard. Reattach the guard assembly to the base.

*Continued*

# MITER JIG

## Time for the miter gauge guides and stop

**1** Cut a pair of miter-gauge guides (E) to fit snugly into the miter-gauge slots in your tablesaw.

**2** Attach the guides to the bottom of the base (A) ensuring that the saw blade is centered on the base and that the base slides back and forth on your tablesaw's slots easily and without wobble. (We rubbed paraffin wax on the wood guides so the base assembly slides smoothly and effortlessly in the tablesaw miter-gauge slots.)

**3** Position the base assembly on your tablesaw, and cut a kerf through the 1¼" hanging hole and DOWN THE CENTER of the base, stopping just before the blade cuts into the rear support (B).

**4** Cut the stop pieces (F, G, H) and ¼×1×2½" aluminum retainer to size.

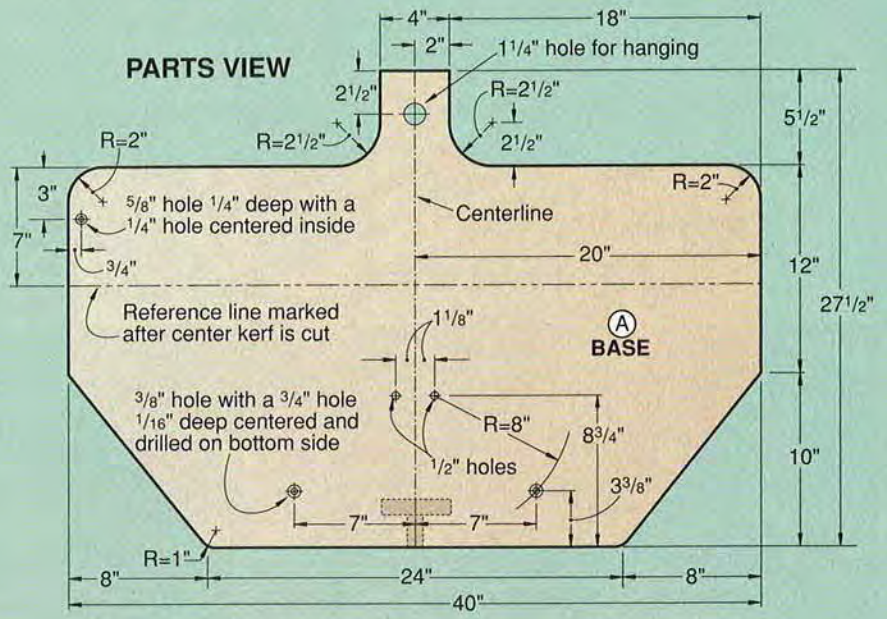
**5** Drill a mounting hole through the stop (G) and your tablesaw table, and bolt part G to your tablesaw table about 1" from the end. See Positioning the Stop Block drawing for reference.

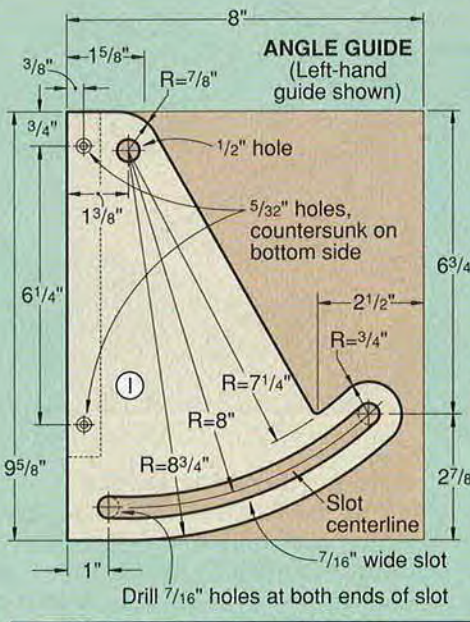
**6** Position the jig base (A) on the tablesaw where the saw blade rests at the end of the kerf in the base and next to the rear support (B). Attach the stopblock (F) to the bottom side of the base (A) next to the stop (G) bolted to the saw table. The stopblock/stop combination (F, G) is designed to stop the jig before the blade cuts through the rear support and so the jig doesn't go over the back edge of the tablesaw.

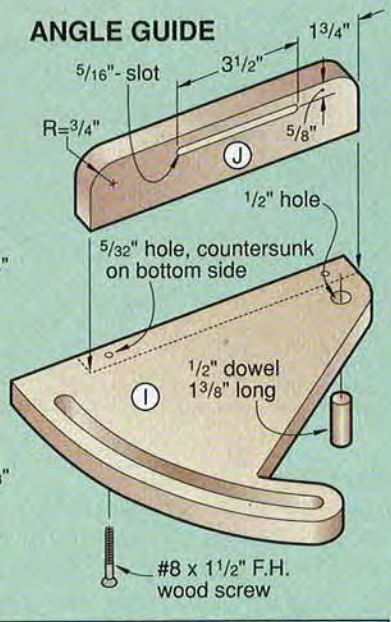
**7** Attach the retainer spacer (H) and aluminum retainer to the bottom of the tablesaw base. The spacer/retainer assembly holds the jig horizontal so it doesn't drop off the operator end of the tablesaw when the operator pulls the jig towards himself.

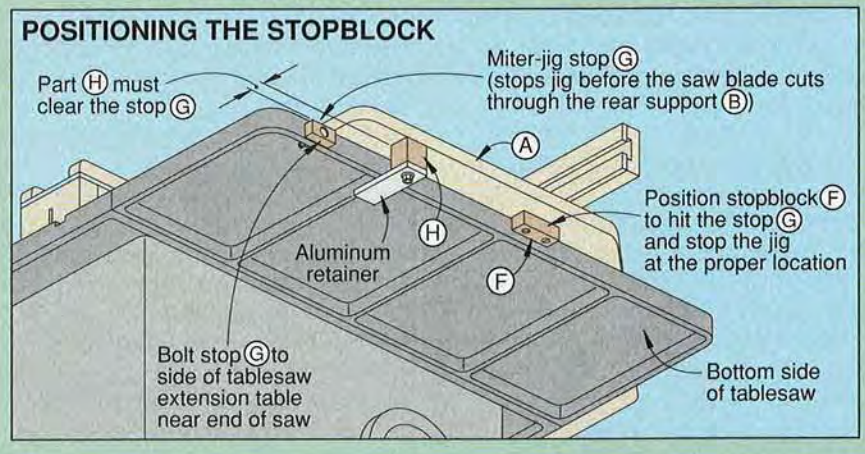
## Construct the angle guides

**1** Cut two pieces of ¾" birch plywood to 8×10" for the angle guides (I). Tape the two angle-guide blocks face-to-face with double-faced tape.





POSITIONING THE STOPBLOCK
Part H must clear the stop G
Miter-jig stop G (stops jig before the saw blade cuts through the rear support B)
A
Position stopblock F to hit the stop G and stop the jig at the proper location
H
Aluminum retainer
F
Bolt stop G to side of tablesaw extension table near end of saw
Bottom side of tablesaw

**2** Using the Parts View drawing for reference, lay out and cut the two angle guides (I) to shape.

**3** Mark the two 7/16" hole centerpoints on the taped-together pieces. Use a compass to mark the outline of the 7/16"-wide slot between the 7/16" holes. Drill the 7/16" holes at each end of the slot. Using a scrollsaw or jigsaw cut along the marked lines between the holes to form the slot. Sand the slot edges.

**4** Use a wood wedge to pry the pieces apart. If the tape bond resists, use lacquer thinner or acetone to weaken the tape.

**5** Cut the fence supports (J) to shape, and form a 5/16"-wide slot in each. Screw a fence support to each angle guide. As noted on the drawing, the left-hand guide is shown; the right-hand guide is a mirror image.

**6** Crosscut a pair of 1/2" dowels to 1 3/8" long. Glue one in each angle guide (I) where shown on the Angle Guide drawing.

## Let's add the fence assemblies and stops

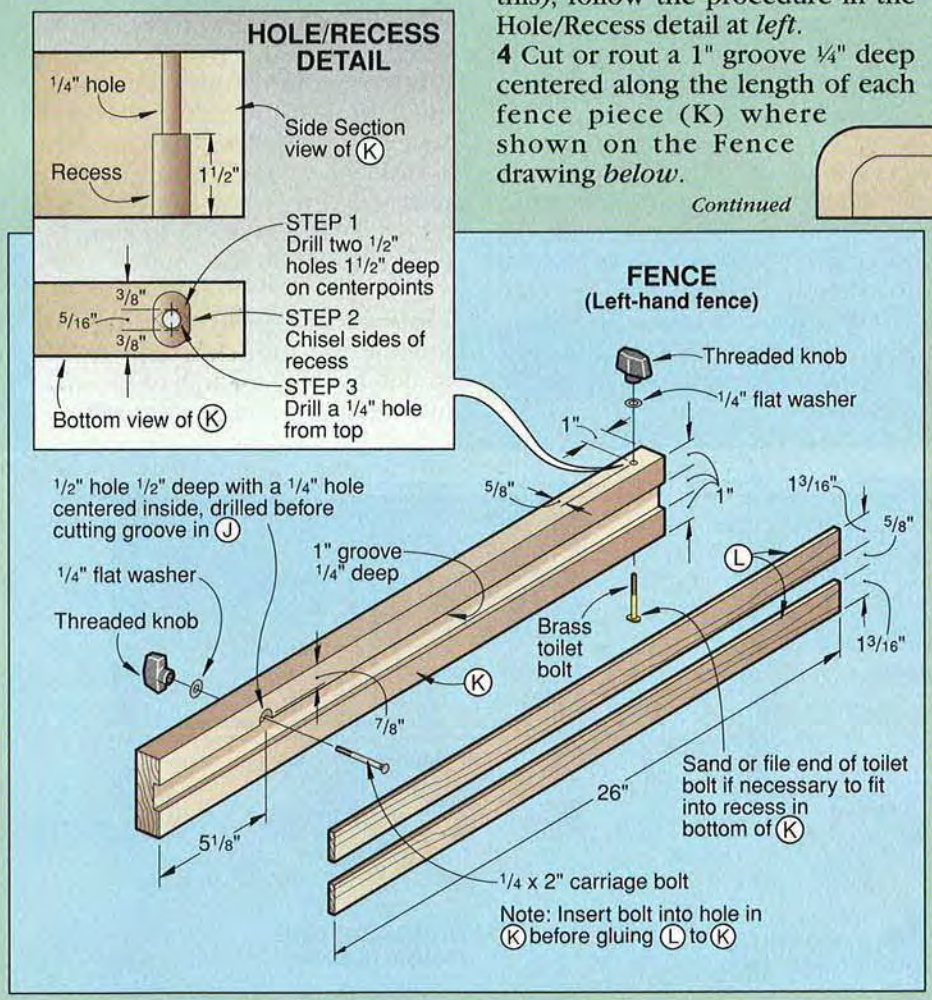
**1** Cut the two fence pieces (K) and four retainers (L) to size from solid stock.

**2** Mark the centerpoint on each fence piece (K), and drill a 1/2" hole 1/2" deep with a 1/4" hole centered inside where shown on the Fence drawing for the 1/4×2" carriage bolt. The carriage bolt that goes through this hole will be used to connect the fence (K) to the fence support (J).

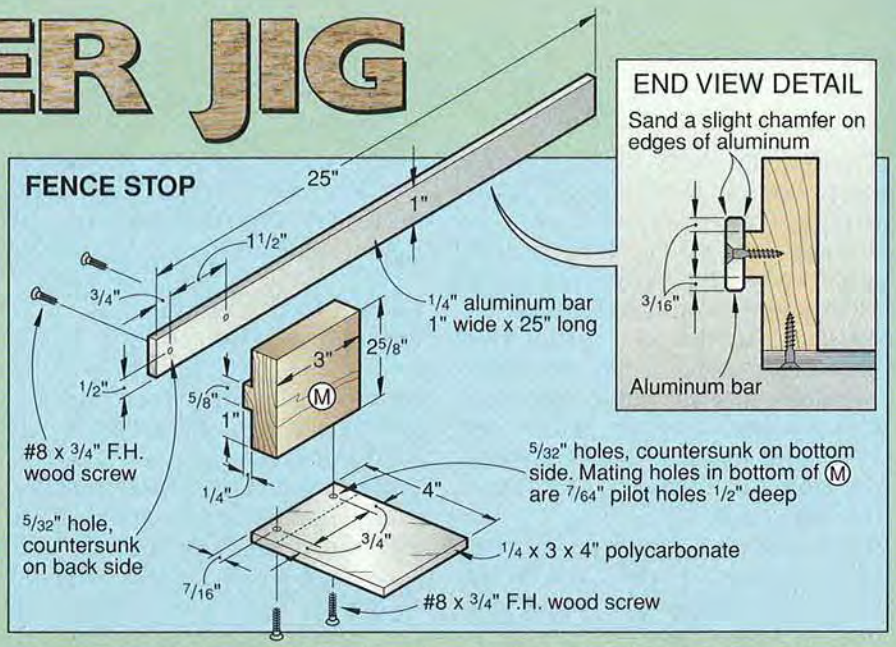
**3** To drill the hole and recess for the stop lock-down mechanism (we're using a brass floor flange toilet bolt trimmed to 2 3/8" long for this), follow the procedure in the Hole/Recess detail at *left*.

**4** Cut or rout a 1" groove 1/4" deep centered along the length of each fence piece (K) where shown on the Fence drawing *below*.

*Continued*



# MITER JIG




**5** Glue and clamp the retainers (L) to the fences (K) keeping the inside edges of the guides ⅝" apart the length of the fence. See the Fence Assembly Section View for reference.

**6** Using the Fence Stop drawing for reference, cut the stops (M) to size. (For safety when machining, we started with a piece 1 1/16×2⅝×10" and cut a pair of 1" rabbets ¼" deep along one face. Then, we crosscut two 3"-long sections from it.) Check the fit of the the stops (M) between the retainers (L). The stop should slide back and forth easily without an excess of free play.

**7** Cut two ¼×3×4" pieces of polycarbonate to act as stop plates. Drill a pair of countersunk mounting holes in each, and screw the stop plates to the bottom of the stops (M) where shown on the Fence Stop drawing.

**8** Crosscut two pieces of ¼×1" aluminum bar stock to 25" long. Drill a countersunk pair of mounting holes in each bar where shown on the Fence Stop drawing. Screw the stops (M) to the aluminum stock.

**9** Trim a brass floor flange toilet bolt to 2⅜" long, and insert it into the recessed hole in the bottom side of fence (K) where shown on the Fence drawing. You may need to sand or file the head of bolt slightly to fit into the recess. Slide a washer onto the top of the toilet bolt, and add a threaded knob. Turn the knob clockwise to pull the brass toilet bolt up against the bottom of the aluminum bar, locking it in place.

## Marking the angle reference marks

**1** As shown in Photo A on the *opposite page*, position and clamp a straightedge perfectly square to your saw blade on the jig base. (As shown in the photo, we used an adjustable triangle to accurately locate the straightedge. See the Buying Guide for our source of this handy device.) Mark a reference line across the jig where shown on the Parts View drawing. Leave the straightedge clamped to the base.

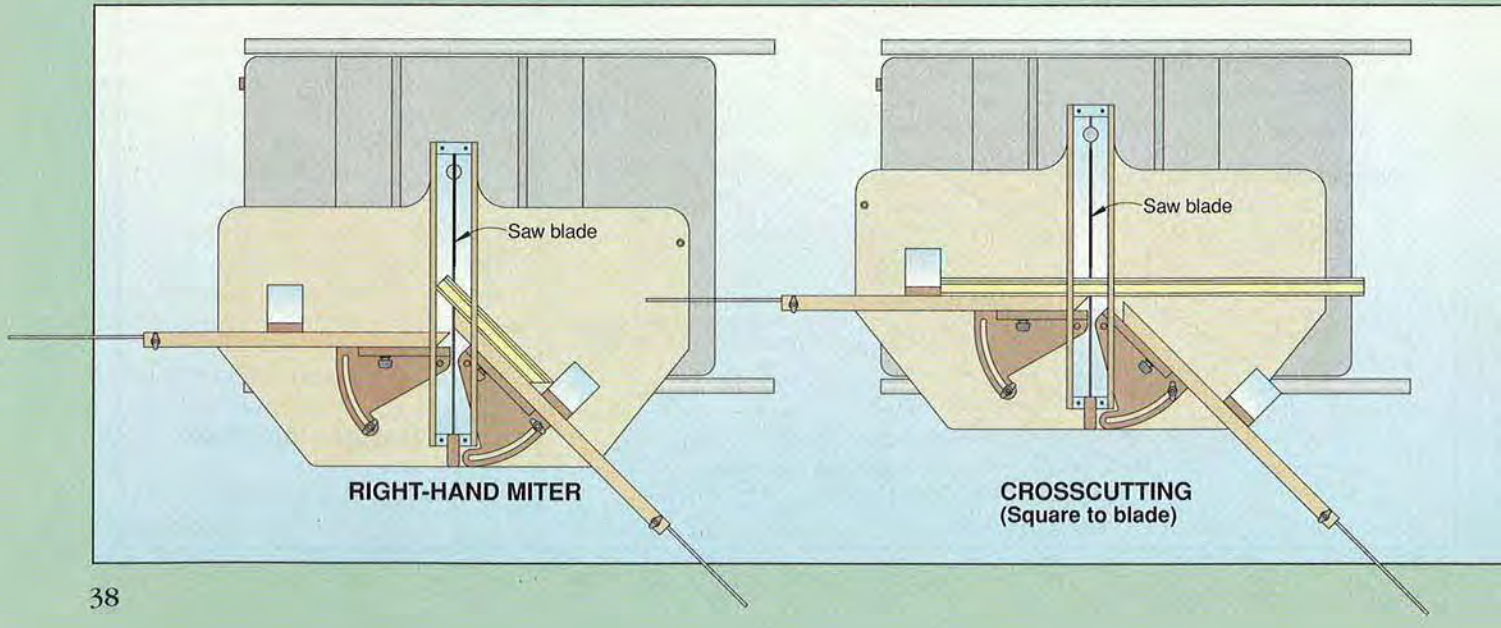
**2** Position the pivoting fences (minus the stops) on the base.

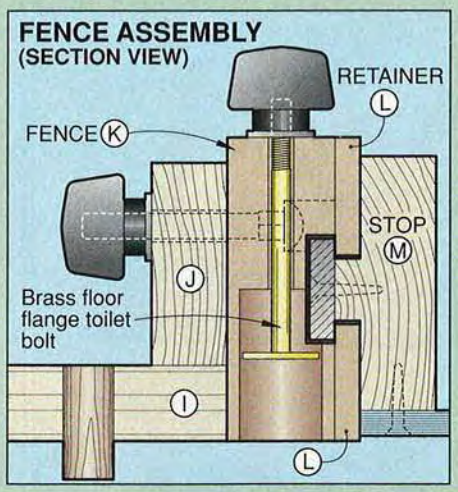
**3** Align both fences parallel to the marked reference line. Mark a second reference line along the FRONT EDGE of the fences. Use this line to position either fence for crosscutting at 90°.

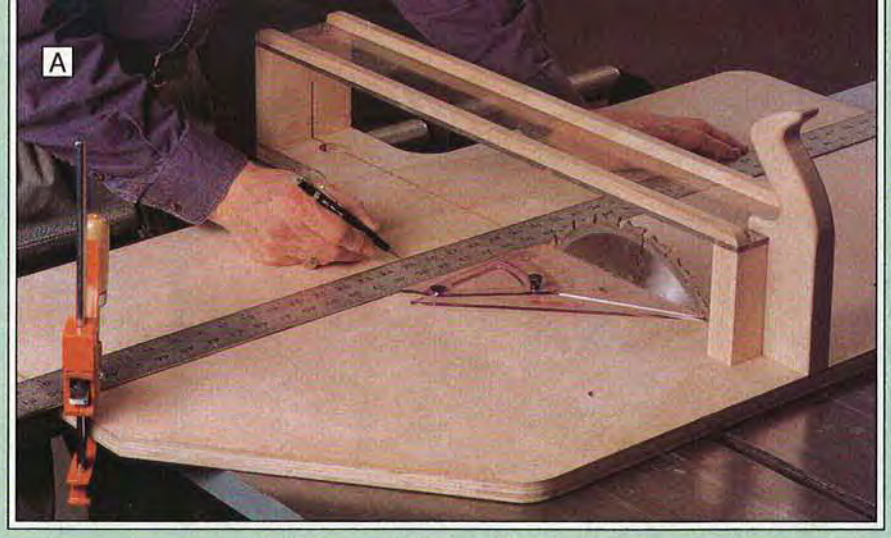
**4** As shown in Photo B at *far right*, use the adjustable triangle to accurately position the fence. Then, mark reference lines onto the base, using the BACK EDGE of the fence as a straightedge. (We marked reference lines at 15°, 22.5°, 30°, and 45°.) Repeat for both sides of the jig.

## How to use your new jig

Review the four drawings *below* to determine our method for making miter-cuts and crosscuts.

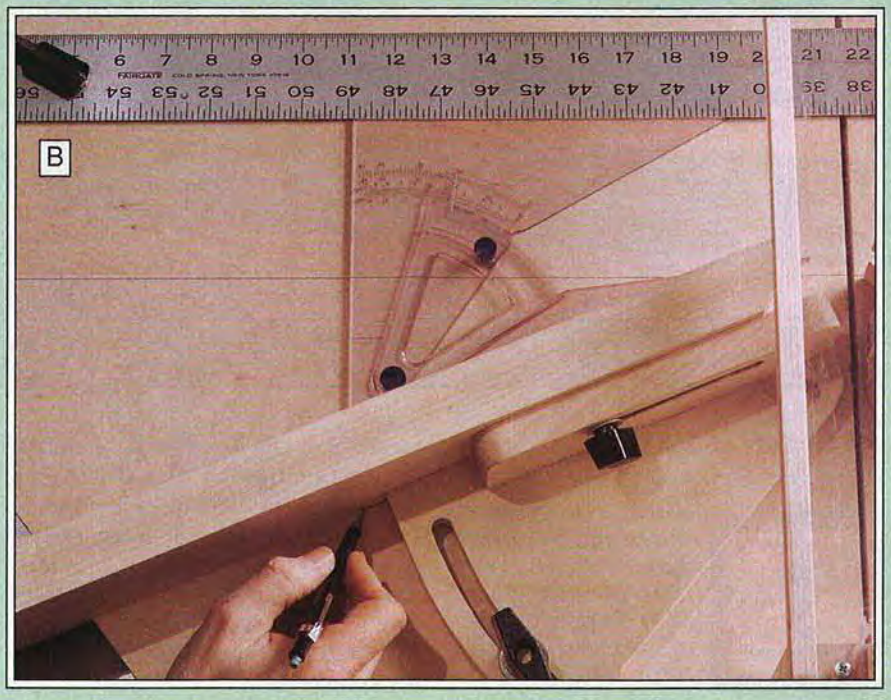





▲ Clamp a straightedge square to the saw blade. Mark a reference line across the back edge of the straightedge.

▼ Use an adjustable triangle to position the fence. Mark reference lines on the base along the back edge of the fence.

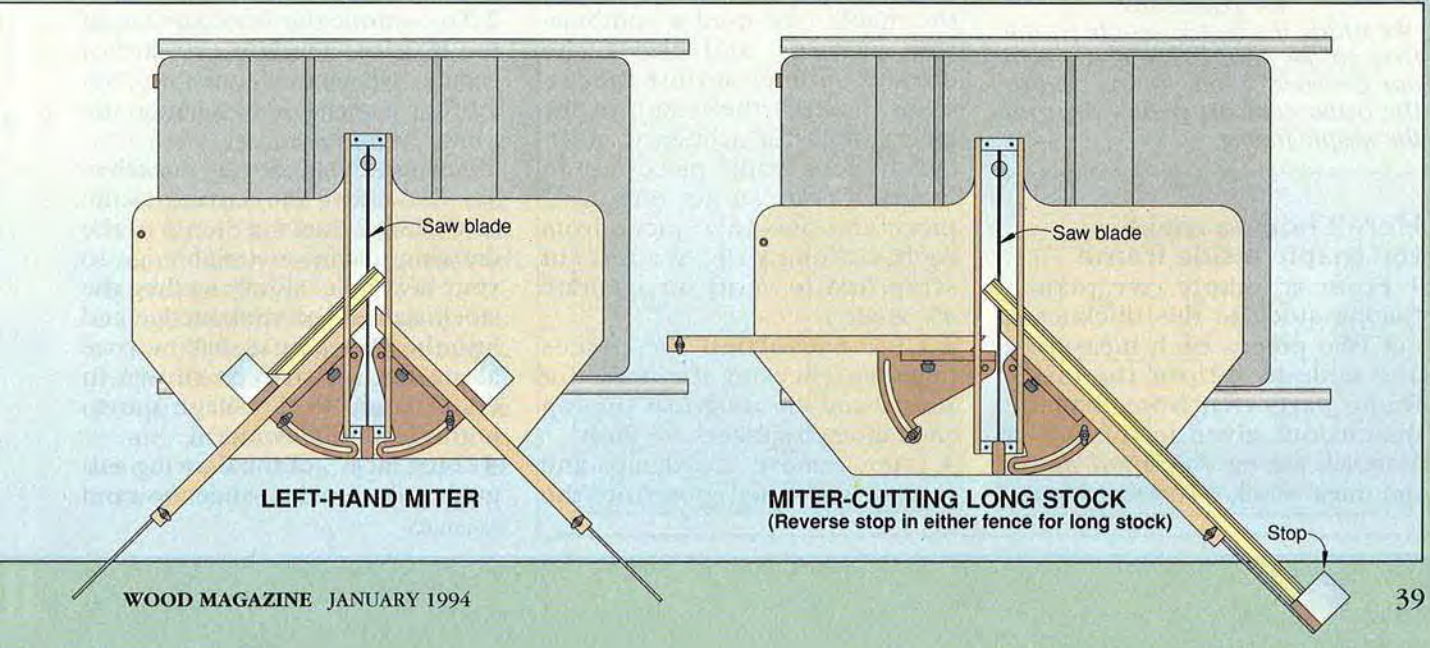



## Buying Guide

**Miter jig hardware kit.** Screws, toilet bolt, aluminum bar stock for fences and safety stop, polycarbonate for guard and stops, nuts, bolts, and washers. Kit no. WM-MJ, $14.95 ppd. Miller Hardware, 1300 M.L. King Pkwy., Des Moines, IA 50314 or call 515/283-1724 to order.

**Adjustable triangle.** 8" model, stock no. 8211-8, $19.37 ppd.. The Art Store, 600 M.L. King Pkwy., Des Moines, IA 50312 or call 800/652-2225 or 515/244-7000 to order.

Produced by Marlen Kemmet
Project Design: James R. Downing; Jim Boelling
Photographs: Bill Hopkins; John Hetherington
Illustrations: Kim Downing



## True-to-Tradition Picture Frame

***Note:** The larger, more traditional frame shown here was miter-cut to fit a 14×20" piece of artwork. For other sizes, you'll need to change the frame size.*

*We made the inside maple frame first so we could size it around our artwork. Then, we cut and fit the outer walnut frame around the maple frame.*

### Here's how to make the maple inside frame

**1** From ⅜" maple (we planed thicker stock to this thickness), cut two pieces each measuring 1½" wide by 42" for the inside frame parts (A). Note that the dimensions given in the Bill of Materials are for the *initial size* of the lineal stock. (To machine the stock for the four inside maple frame pieces, we found it easier to work with two 42"-long pieces rather than one 84"-long strip.) Cut or rout a ¼" rabbet ½" deep along one edge of each piece. See the Section View detail accompanying the Exploded View drawing for reference.

**2** Mark the miter-cut locations on the maple (we used a combination square), and check the marked cutlines against the artwork to verify the length of the pieces. Adjust if necessary. Miter-cut the four maple pieces (A) to length. (You can get one 22½" piece and one 16½" piece from each 42"-long strip. We test-cut scrap first to verify an accurate 45° angle.)

**3** Glue and clamp the pieces together, checking the frame for square and ensuring that the top and rabbeted surfaces are flush.

**4** Later, remove the clamps and remove any dried glue from the corners. Then, finish-sand both surfaces of the maple frame.

### Now, for the walnut outer frame

**1** For the walnut frame, cut two pieces to ¾×1½×52" for parts B, two to ½×1×52" for parts C, and two pieces to ½×½×52" for frame parts D.

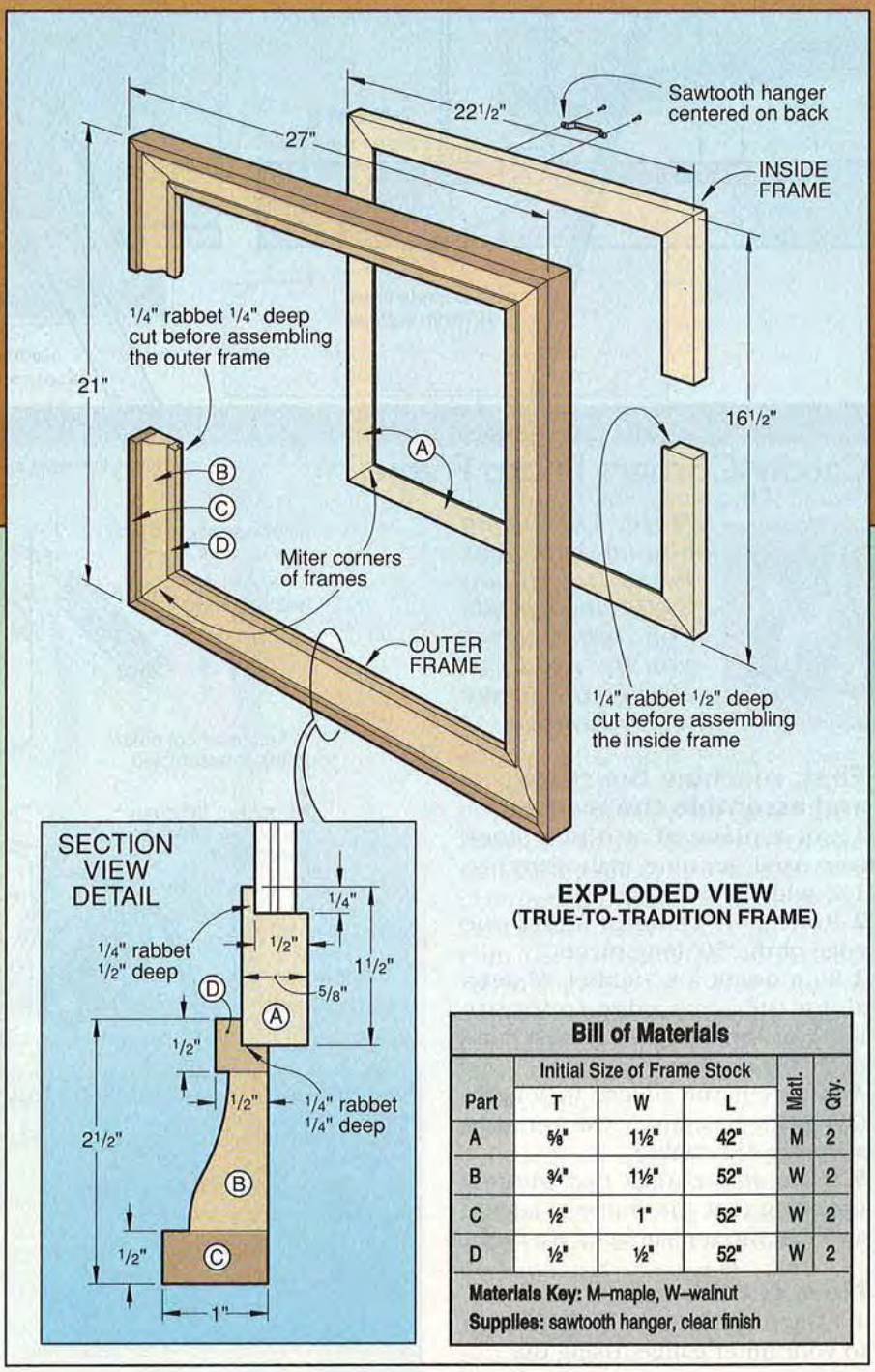
**2** To contour the front surface of the B strips, bevel-rip one face of each at 16° where shown on Step 1 of the three-step drawing on the top of *pages 42* and *43*.

**3** Position the blade on your tablesaw 1/16" above the surface of the saw table. Following Step 2 of the drawing, clamp a straightedge to your saw table. Slowly feeding the stock against the straightedge and into the blade, cut a shallow cove along each B strip as shown in Photo A and to the shape shown in the Section View detail.

**4** Using Step 3 of the drawing as a guide, use a palm sander to sand

# CUSTOM-CUT YOUR OWN SHOW-STOPPING PICTURE FRAMES

**Every year we receive numerous letters from readers interested in framing their own artwork or photos. The reason? Prices for quality picture frames have soared through the roof. But by building one or both of these good-looking hardwood frames, you can pocket a lot of change–and learn some practical woodworking techniques to boot. Come on–let's get started.**




**EXPLODED VIEW**
**(TRUE-TO-TRADITION FRAME)**

**Bill of Materials**

| Part | Initial Size of Frame Stock T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|
| A | ⅝" | 1½" | 42" | M | 2 |
| B | ¾" | 1½" | 52" | W | 2 |
| C | ½" | 1" | 52" | W | 2 |
| D | ½" | ½" | 52" | W | 2 |

**Materials Key:** M–maple, W–walnut
**Supplies:** sawtooth hanger, clear finish

the areas noted to finish shaping the profile of the B strips.

**5** With the back edges flat, glue and clamp one C strip and one D strip to one of the contoured center strips (B) where shown in the Section View detail. Immediately remove any excess glue from the front contoured edge of the frame blank. Repeat the process to laminate the remaining three pieces for the outer frame.

**6** Cut or rout a ¼" rabbet ¼" deep along the inside edge of the walnut outer frame blanks where shown on the Section View detail.

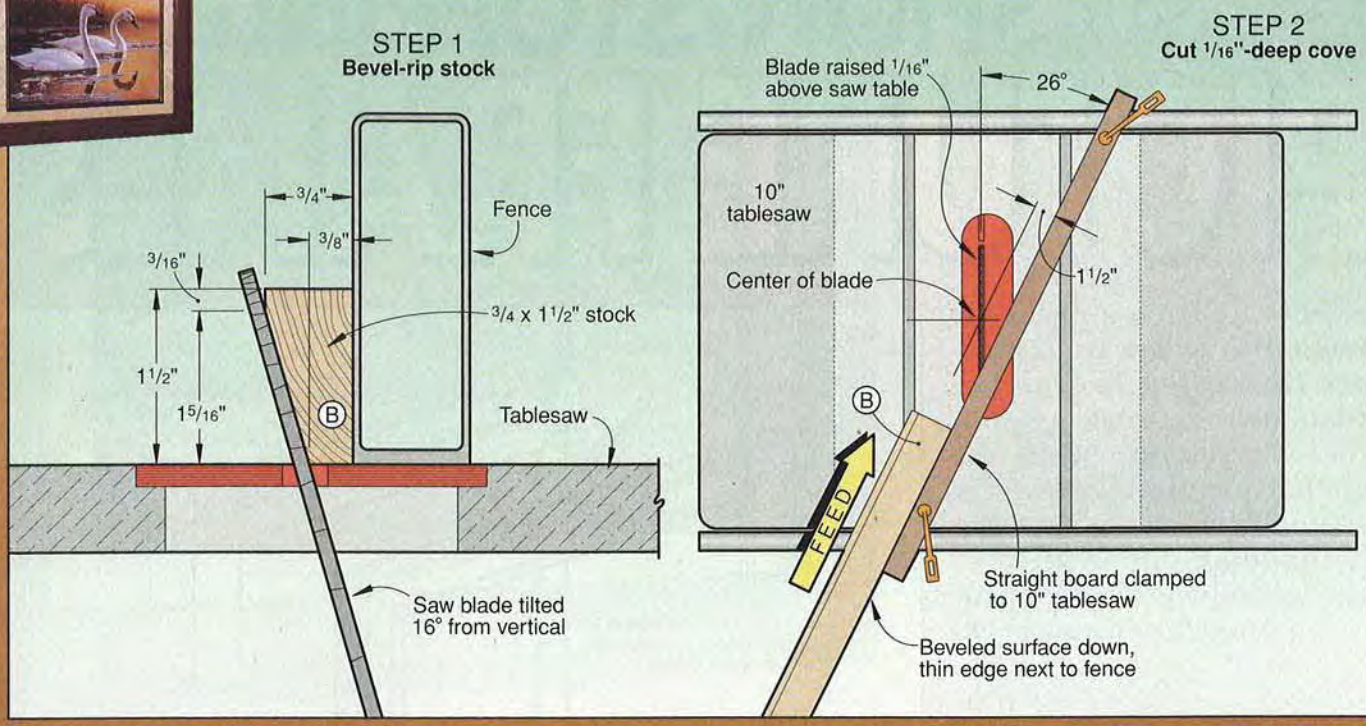
**7** Miter-cut one short and one long length of frame from each walnut lamination to fit around the maple frame.

**8** Glue and clamp the miter-cut walnut pieces around the maple frame. Remove excess glue.

**9** Apply a clear finish to the frame, and later add a sawtooth hanger to the back of it. Add the artwork and hang.

*Continued*

## True-to-Tradition Picture Frame *Continued*




## Catchy-Corners Photo Frame

***Note:** The frame shown here was made to fit an 8×10" photograph. For other sizes you'll need to change the frame size accordingly.*

### First, machine the stock and assemble the frame

**1** Cut a piece of ¾"-thick stock (we used genuine mahogany) to 1⅝" wide by 50" long.

**2** Rout a ¼" chamfer along one edge of the 50"-long piece.

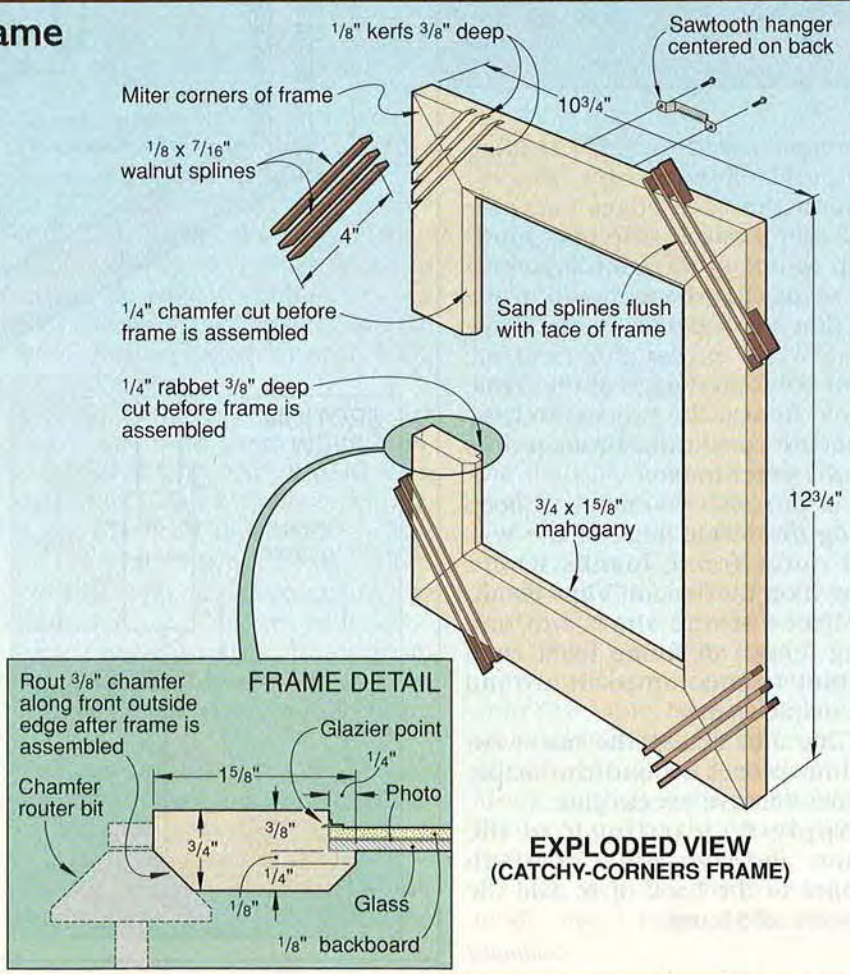
**3** Rout or cut a ¼" rabbet ⅜" deep along the same edge (opposite face) of the stock. See the Frame detail for reference.

**4** Miter-cut the pieces to length. (We test-cut scrap first to verify an accurate 45° angle.)

**5** Glue and clamp the pieces, checking that the frame is square and that the top surfaces are flush.

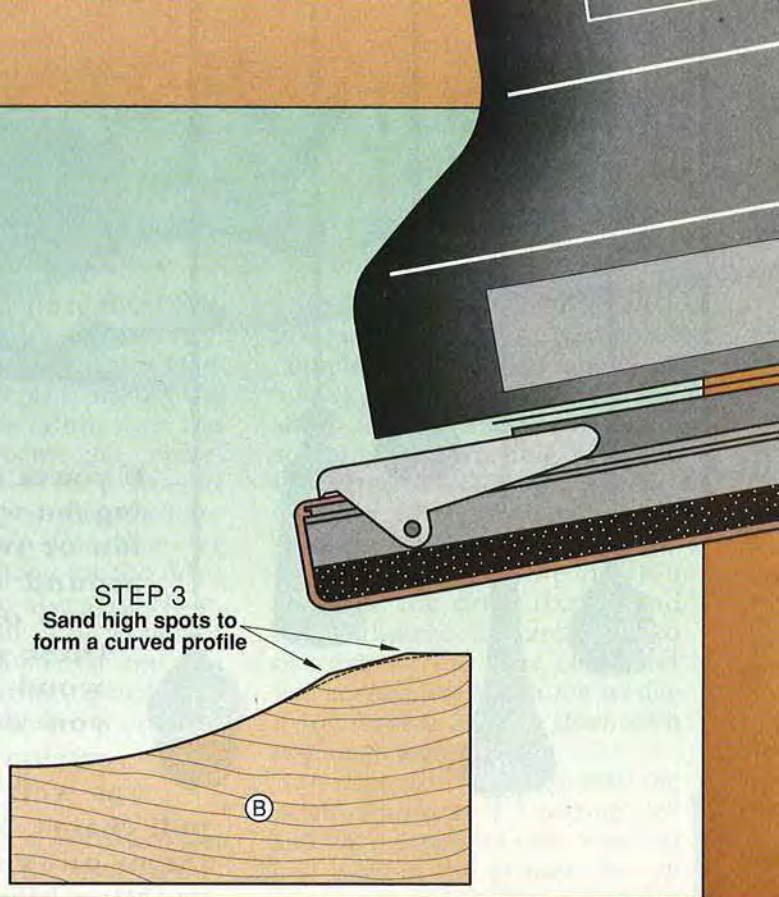
### Now, cut the spline kerfs

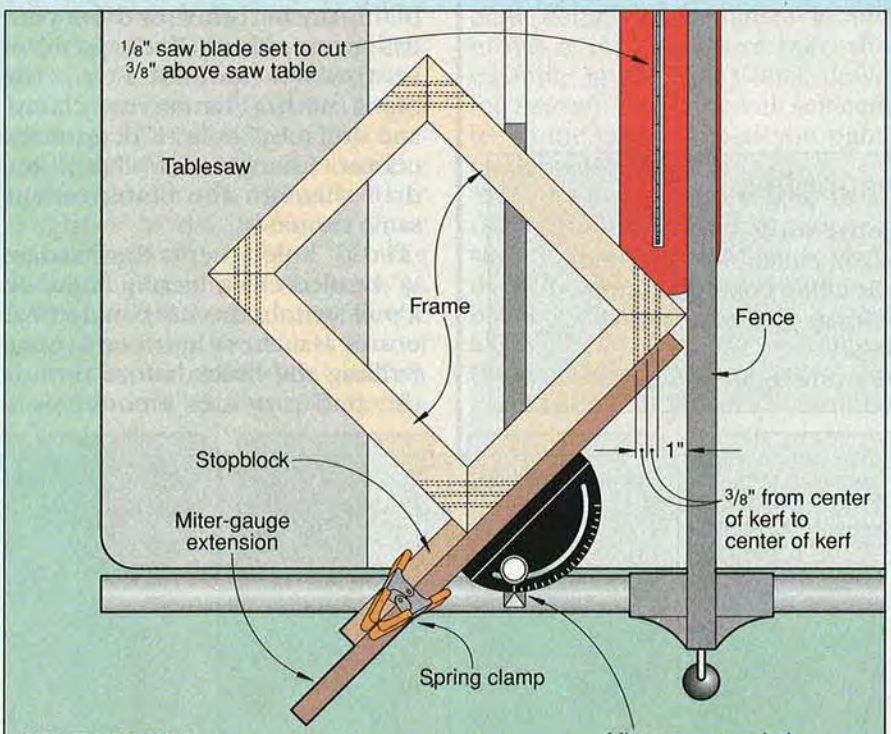
**1** Attach a miter-gauge extension to your miter gauge. Using the




**EXPLODED VIEW**
**(CATCHY-CORNERS FRAME)**

Clamp a straightedge in place, raise the blade 1/16" above the saw surface, and cut a cove in the frame stock.




**CUTTING THE SPLINE KERFS**

Angle miter gauge 45° from center. Mark outside kerf location at one corner, and align marked kerf with saw blade. Clamp stopblock in place, position fence, cut opposing corners, adjust stopblock, and cut remaining corners. Repeat for middle and inside kerfs.

drawing titled Cutting the Spline Kerfs at *left*, mark the kerf locations, position the fence and stop, and cut the kerfs.

**2** Plane or resaw maple until its thickness (1/8") fits into the kerfs. Next, rip 7/16"-wide strips, and crosscut 12 pieces 4" long each.

**3** Glue one of the 1/8×7/16×4" splines into each 3/8"-deep kerf. Check that the splines bottom out in the kerfs. After the glue dries, trim the splines flush with the outside edges of the frame. (We clamped the frame to our workbench, and used a dovetail saw to trim the ends of the splines to within about 1/16" of the frame edges. Finally, we used a palm-grip sander to sand the splines flush with the frame's edges and front surface.)

**4** Rout a 3/8" chamfer along the outside front edge of the frame.

**5** Finish-sand the entire frame and add the finish. From 1/8" stock (we used plywood) cut the back to fit the rabbeted opening.

Produced by Marlen Kemmet
Project Designs: James R. Downing
Photographs: John Hetherington
Illustrations: Kim Downing

# PULLS

**If you're a woodturning fan with a ceiling fan or two hanging around the house, here's one for you. These nifty scrapwood pulls give you a satisfying session at the lathe as well as classier pull chains. You can use them on your lamps, venetian blinds, or curtains, too.**

Print this article

*Note: We sized the holes in our pulls to accommodate ceiling fan chains. To make pulls for lamps, venetian blinds, or other items, size the holes appropriately.*

When he turns fan pulls in his Joliet, Illinois, woodturning shop, project designer Dick Sing starts with 1×1×2½" blanks cut from hardwood scraps. "You can alter the dimensions to fit stock you have," Dick points out, "and, of course, you can use any species."

After cutting the blank, mark the center on one end. Stand the blank on its other end on your drill-press table. (Put a piece of scrapwood under it.) Grip the blank with a handscrew clamp, and drill a 5/16" hole ½" deep at the center. Change to a 3/4" bit, and drill through the blank on the same center.

The 3/4" hole accepts the standard 1/8" beaded chain usually found on a pull switch; the 5/16" counterbore conceals the chain end clip. Drilling the holes before turning the pull provides a convenient

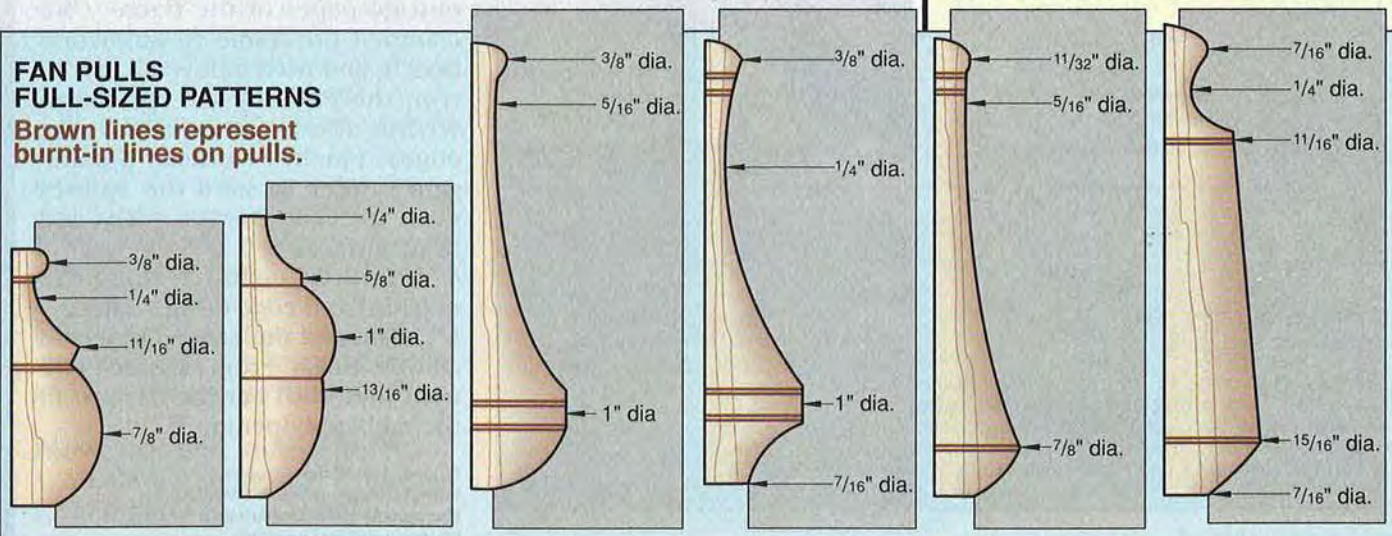
## We used these tools and supplies

**Stock**
- Hardwood scrap, 1×1×2½"

**Lathe speeds**
- Turning, sanding: 1100–1400 rpm

**Lathe tools**
- Drill chuck or 3" faceplate
- Rotating cone tail center
- Gouges, 5/32", 1/4", and ½"
- Skew, ½"
- Parting tools, 1/16" and 1/8"

**FAN PULLS**
**FULL-SIZED PATTERNS**
**Brown lines represent burnt-in lines on pulls.**



# WITH PIZAZZ TURNING THEM IS A *BREEZE*

way to mount the blank on the lathe and ensures that the turning ends up concentric with the holes.

## Friction drives for turning

You can dig in a gouge or snag a skew just as easily on a small turning as on a large one—some say it's even easier. Friction drives prevent such lapses in technique from doing damage—the turning simply stops spinning when it catches on a tool.

A friction drive also makes mounting and dismounting the work a snap. That's why production turners often rely on it.

For this project, Dick devised a simple friction drive utilizing a ½" drill chuck. If you don't have such a chuck for your lathe, you can set up a drive with a 3" faceplate.

• **With a drill chuck.** Cut a 1½"-dia. circle from ⅛" stock (Baltic birch plywood will do the trick), and drill a 9/64" hole through its center. Install your drill chuck on the lathe headstock. Chuck a 3" length of 9/64"-dia. brass, steel, or aluminum rod into it, letting about 1" extend past the jaws. (A 9/64" twist drill works fine for the rod; just clamp the fluted part of the bit in the chuck jaws and let the plain end stick out.) Slide the wooden disc against the jaws.

• **With a faceplate.** Alternatively, attach a 1½"-thick auxiliary faceplate to a 3" faceplate. Mount the assembly on the lathe, turn the face true, and locate the center. Drill a 9/64" hole 1" deep straight into the center of the auxiliary faceplate. Turn a 1½"-diameter tenon about ¾" long for the drive surface, where shown *below*. Insert a 2" length of 9/64"-diameter brass, steel, or aluminum rod into the hole. Glue it into place with cyanoacrylate adhesive or epoxy.

## It's time to pull it all together

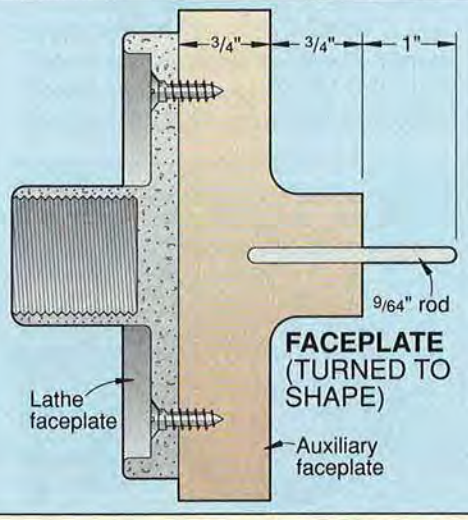
To mount the workpiece on either drive, slide the small hole in the blank over the rod on the drive fixture. Install a revolving cone center in the tailstock, and move it into position (see the example in the Drill Chuck drawing *below*). The cone will self-center in the larger hole as you tighten the tailstock.

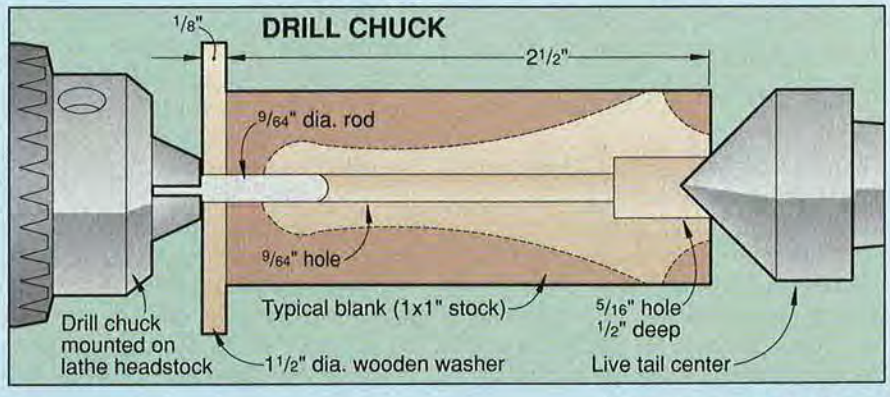
Select one of the designs from the templates *opposite page* or sketch a template of your own design. Then, round down the blank with the ½" gouge. At the tailstock end, form the bottom of the pull, cutting as close to the cone center as you feel comfortable. Shape the profile with gouges and skews, but don't complete the rounded top yet.

Work with a light touch and sharp tools, cutting rather than scraping (see Turning Between Centers, *WOOD*® magazine, October 1993). If your turning stalls too easily, tighten the tailstock to increase the friction between the drive fixture and the workpiece. Be careful not to overtighten; the cone tail center will act just like a splitting wedge if you force it into the stock with too much gusto.

Cut decorative grooves with the point of a skew or a parting tool laid flat on the tool rest. You also can burn-in the grooves for an additional accent. To do that, cut a 12–18" length of light, solid wire (18 gauge or thereabouts). Tie each end to a handle, such as a 3" length of dowel or scrapwood. With the lathe running, press the wire into the groove and hold it there until friction burns the wood.

Sand the completed turning. Complete the rounded tip with the skew. (You can cut right down to the rod; it will keep the turning from flying off the lathe.) Spray on clear lacquer or dip the turnings in an oil finish.




Project Design: © Dick Sing
Photograph: John Hetherington
Illustrations: Kim Downing

In the Olympic spirit

# NORWEGIAN

Print this article

**Watch closely when television cameras cover life in snow-covered Lillehammer, Norway, during the Winter Olympics. You'll probably spot many of the items shown here. That's because Norwegians take pride in a wood tradition that goes back to the Vikings.**

Archaeologists unearthing the nearly intact remains of a Viking ship from a farm called Oseberg, near Toensberg, Norway, in 1904 discovered, among other things, a wealth of wooden artifacts within. The Oseberg Ship, now housed in an Oslo museum, yielded a carriage, furniture, and all types of household and personal items, each of such craftsmanship to indicate that carving and woodworking was a leading art form in 800-1050 A.D. And throughout the following centuries, it was from that 1,000-year-old tradition that Norway's self-taught craftsmen drew inspiration.

## With but an ax and a knife

Factories born of the Industrial Revolution began to draw Norwegians to the cities in the late 19th century. But before that, they mostly lived on farms where, they practiced self-sufficiency. They raised their food, built buildings, and made their own tools, utensils, and furniture—mainly of birch, spruce, and pine. And they did this without the specialized tools of the trained wood craftsmen found in the cities.

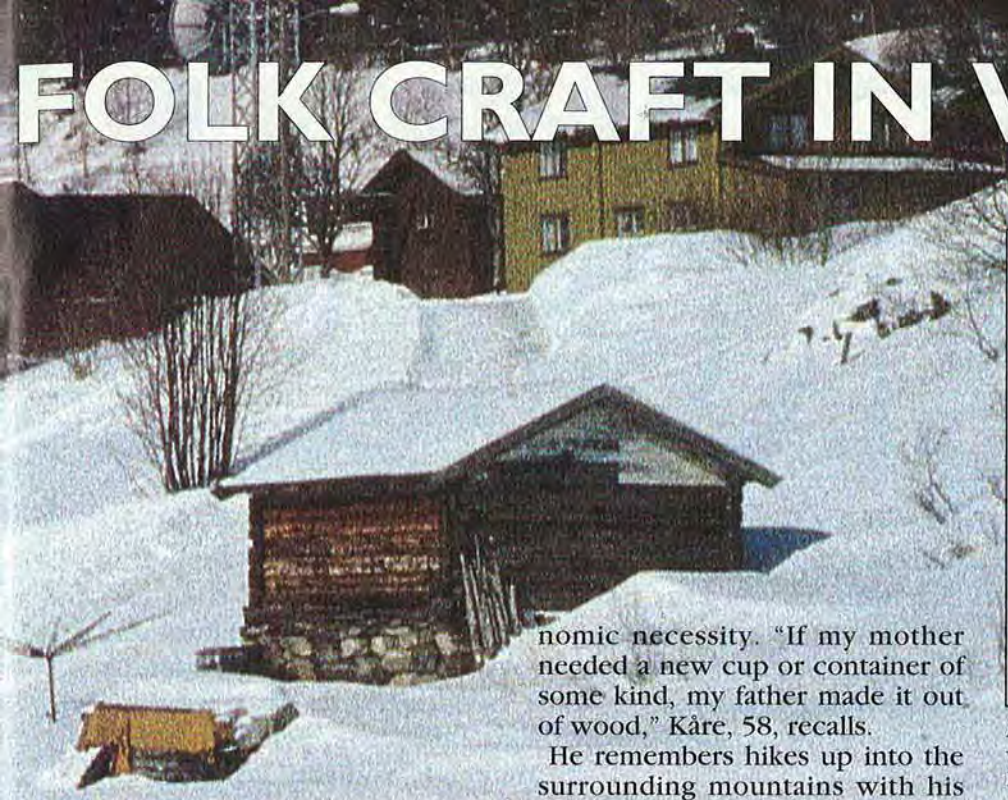
A royal decree in effect from the late-17th century to the late-18th century actually made it illegal for anyone except members of the professional craftsmen's guild to own refined tools. So, for about 100 years, Norway's "hobby" woodworkers made do with axes and knives. Yet, they developed fine skills with these simple tools.

Norwegian home woodworkers learned to take advantage of misshapen wood, such as twisted branches, curved limbs, and oddly formed burls. With an ax and a knife, it was easier to finish off a preformed crooked branch into a coat hook or scythe handle than to shape one from straight wood. Also, the grain in the natural piece—because it followed the form—was stronger than that in a piece of wood worked to that shape. These items were decorated in the Viking way by chip-carving, relief, incising, or burning.

**This carved birch-burl cup features decoration called *kolrosing* or *barkrosing* in Norway.**

Written by Peter J. Stephano with Harley Refsal  Photographs: Harley Refsal, Kåre Herfindal

# FOLK CRAFT IN WOOD



After studying Norway's folk-style of woodworking, Kåre now prefers the hunt for wood as much as the crafting.

But in the years following World War II, economic circumstances changed in Norway. Handmade wooden articles, such as treenware and containers, were gradually replaced by manufactured items made of metal or plastic. And when the wooden articles were no longer being used regularly in the home, the skills required to make those articles faded. Now, though, the old skills are once again being practiced as a growing number of woodworkers learn them in government-sponsored programs and schools.

## A craftsman of old ways

Modern-day craftsman Kåre Herfindal (sounds like CORE-ah HAIR-fin-doll) grew up on a farm near where he now lives in Voss, Norway. His boyhood was spent in an era when making wooden objects for the home was an economic necessity. "If my mother needed a new cup or container of some kind, my father made it out of wood," Kåre, 58, recalls.

He remembers hikes up into the surrounding mountains with his father, a jack-of-all-trades who didn't throw away anything that might later come in handy. "Dad always carried a small handsaw in his backpack," Kåre says, "and harvested birch limbs to bring back home. A branch that had been formed into a U-shape might be just the bend he was looking for when it came time to fashion a hook for coats or harnesses."

Kåre inherited the same appreciation of wood, and after secondary school, he realized that creating things from natural materials could become a career. So, he went to a teacher's college to study "forming," a subject combining industrial art with fine art.

After graduation, the young craftsman continued learning by taking summer courses that covered a wider variety of traditional woodworking techniques. For instance, Kåre mastered coopering, and how to make *tiner* (bentwood containers similar to Shaker boxes). To get materials, he once again found himself in the woods and mountains of his childhood.

And what Kåre learned and continues to learn, he passes on both to his students and to his three sons. "I think it's important to relay not only the specific techniques, but also the cultural and historical traditions behind them," he comments.

The Nordic craftsman also practices what he preaches by crafting and selling bentwood containers, hooks, clamps, and other items made from naturally shaped wood, as shown in the photos *below*. Kåre's customers—tourists and fellow Norwegians—represent the growing number of people who enjoy things out of a pre-plastic past.

The large ladle, carved from birch, sells in Norway for $73 (U.S.)

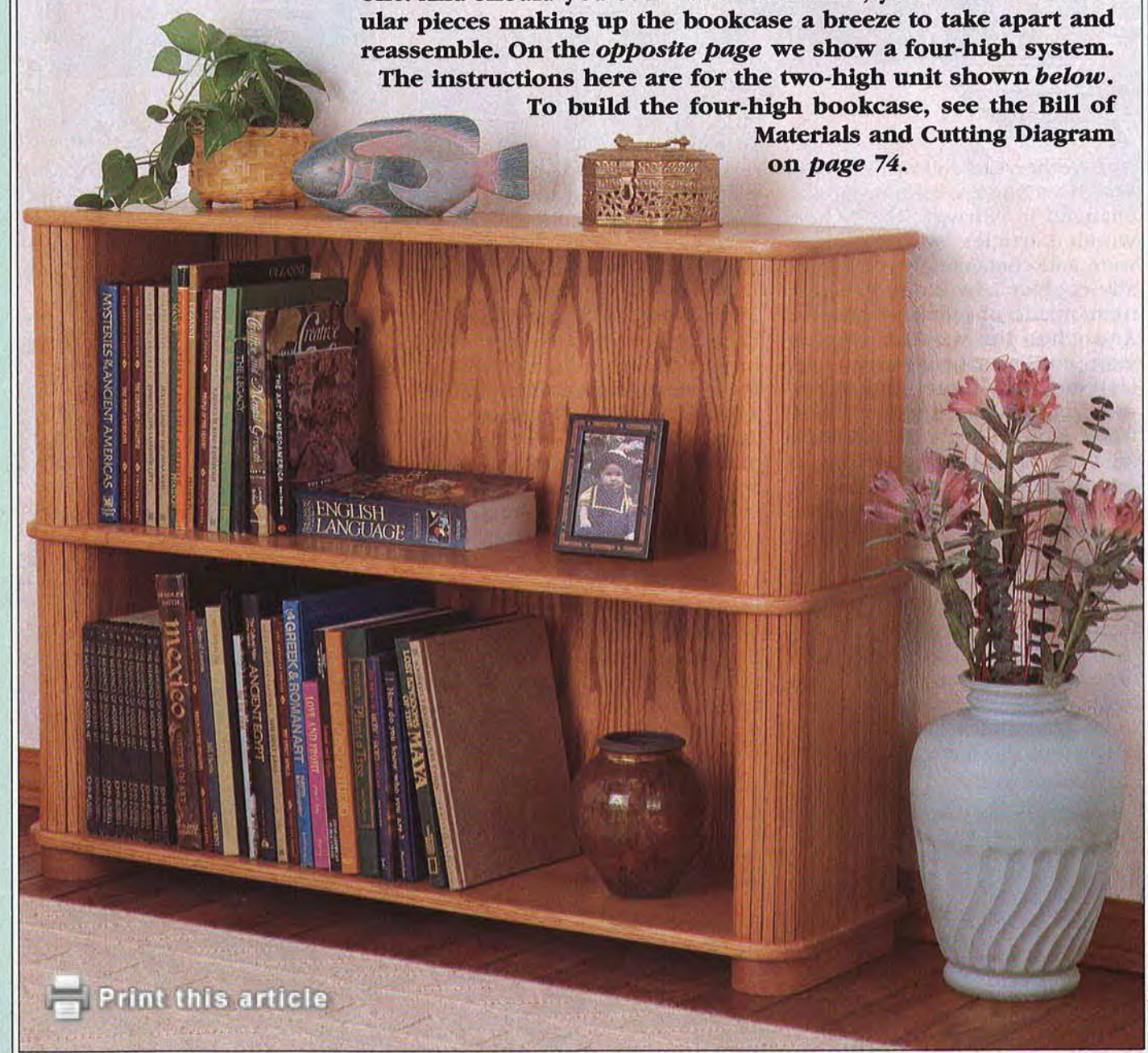
In Norwegian, *tiner* means lidded containers made of thick wood veneer.

This bentwood piece could be used as a flour scoop or a bread basket.

Kåre crafted this C-clamp (about 7" across) from a curled birch branch.

# TERRIFIC TAMBOUR BOOKCASE

**We've seen a great many bookcases in our travels around the country, but none more good-looking and versatile than this one. And should you ever have to relocate, you'll find the modular pieces making up the bookcase a breeze to take apart and reassemble. On the *opposite page* we show a four-high system. The instructions here are for the two-high unit shown *below*. To build the four-high bookcase, see the Bill of Materials and Cutting Diagram on *page 74*.**

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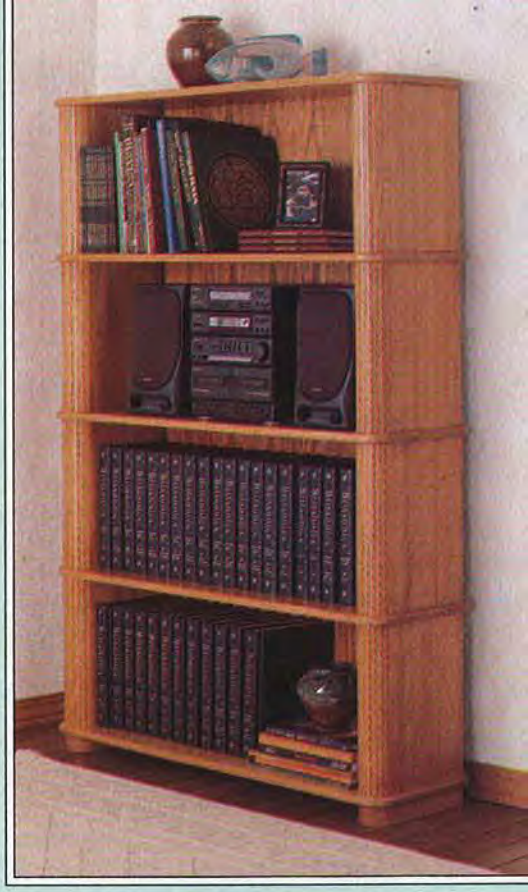


## Start by forming the edge-joined oak shelves

**1** From ¾"-thick hardwood (we used oak), edge-join enough narrow stock to form three panels measuring 13" wide by 44" long. You'll use one panel for the upper shelf, another for the middle shelf, and the third for the lower shelf (all labeled A).

**2** Rip and crosscut the three shelves to 12½" wide by 42" long. Sand both faces of each panel.

**3** Mark a 2⅛" radius on each corner of each shelf. (See the Parts View drawing *below* for reference.) Cut and sand the corners to shape. If you do this on the bandsaw, you'll need a helper to support the long panels when making the corner cuts. Using a pencil, label one shelf UPPER, another MIDDLE, and the third, LOWER. Labeling the parts now helps ensure the correct machining to the proper face of each shelf later.

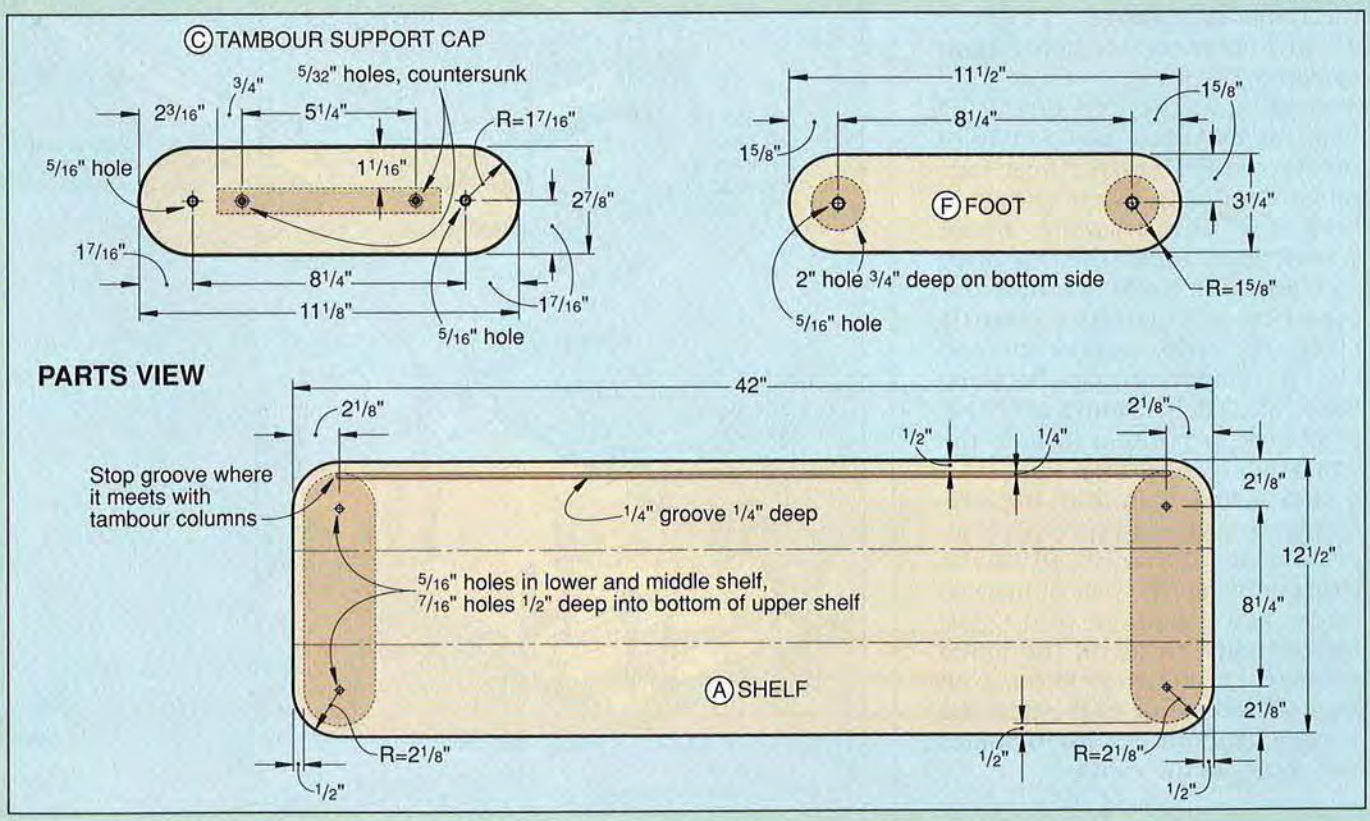
**4** Drill four 7/16" holes ½" deep into the bottom side of the upper shelf, using the same centerpoints used to mark the 2⅛"-radiused corners. Using a wide-blade screwdriver, drive a ¼"-threaded insert squarely into each of these holes until the notched end of the insert is flush with the bottom surface of the shelf where shown on the Threaded Insert detail accompanying the Exploded View drawing.

**5** Switch bits, and drill 5/16" holes through the middle shelf and lower shelf, again using the hole centerpoints you marked earlier. You'll slide the all-thread rod through these holes later when assembling the modules.

**6** Make start and stop marks for the grooves (2⅛" from the ends) along the back edge on the bottom side of the upper shelf, both sides of the middle shelf, and top side of the lower shelf where dimensioned on the Parts View.

**7** Fit your router with a ¼" straight bit and edge guide. If you don't have an edge guide, clamp a straightedge (a straight board will work) to the shelf. Rout a ¼" groove ¼" deep along the back edge of each shelf where marked. You'll use these grooves to house the plywood backs (E).

*Continued*



**8** Rout ¼" round-overs along the top and bottom edges of each shelf. Sand the shelves smooth.

## Now, let's cut the tambour strips to size

**1** To make four tambour support columns, you'll need 56 strips (B) per column, or a total of 224 strips for the four columns. (We cut about 240 strips, giving us extras to substitute for strips with defects.) To form the strips, plane thicker stock to 7/16" thick. Crosscut the 7/16"-thick stock to 29" long.

**2** Set the fence on your tablesaw 3/16" from the inside edge of the blade (for smooth cuts, we used a 40-tooth, carbide-tipped saw blade). Rip 120 of the 3/16×7/16×29" strips (B).

**3** Complete the B parts by crosscutting two 14"-long strips from each of the 29"-long strips.

## Glue and clamp the oak strips to the canvas

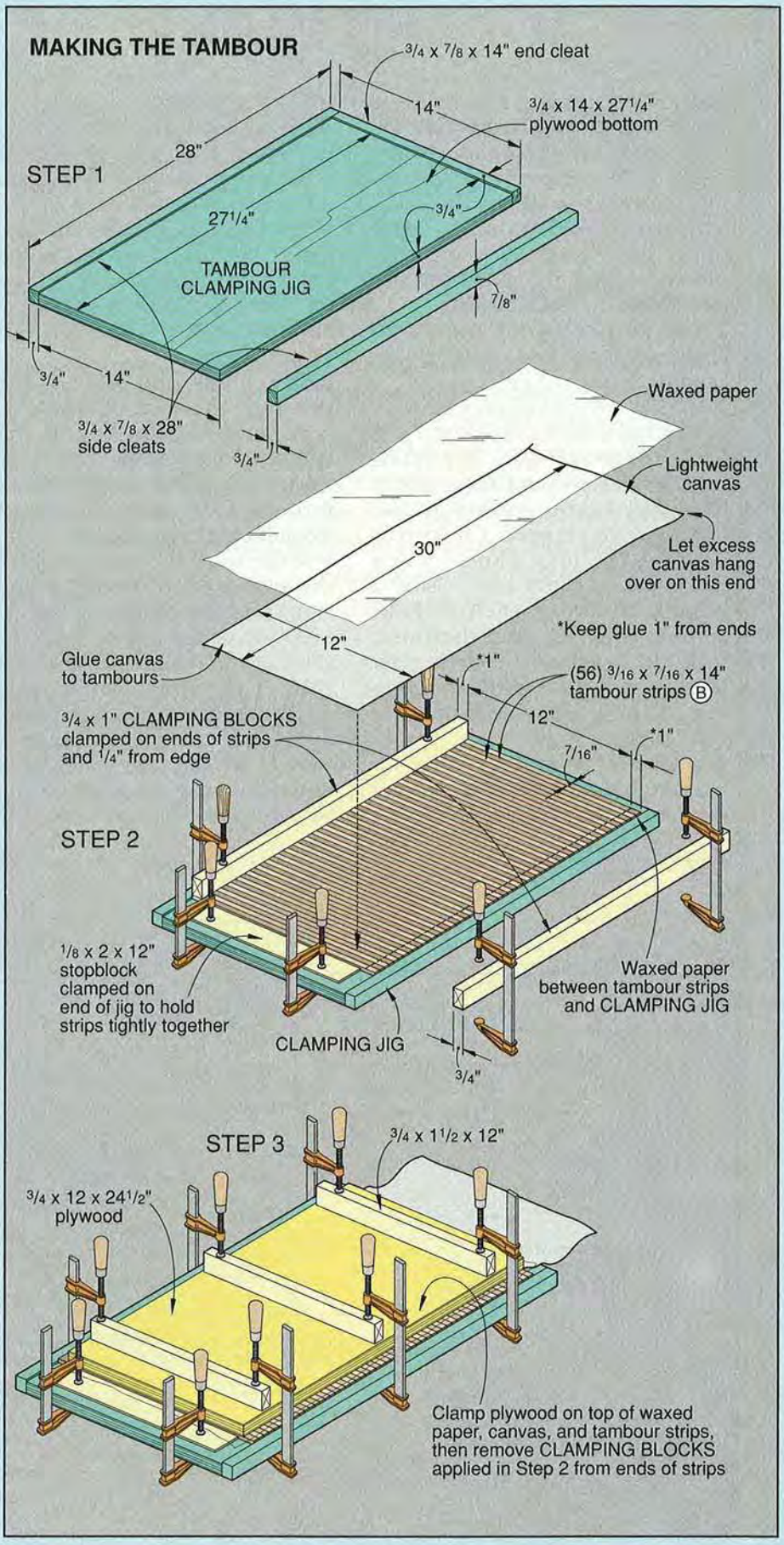
**1** Build the Tambour Clamping Jig shown in Step 1 of the Making the Tambour drawing.

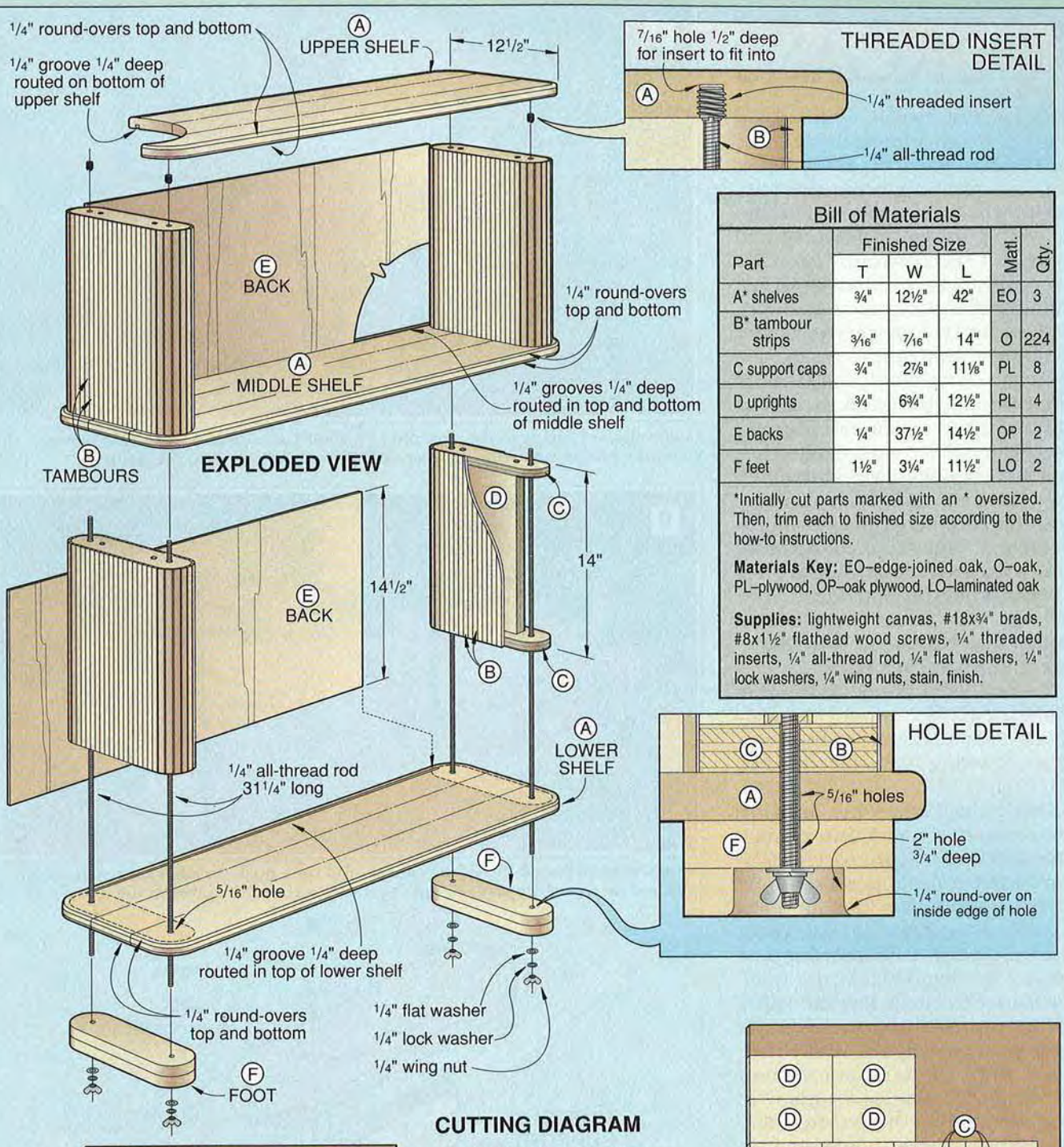
**2** Cut four pieces of lightweight canvas to12×30" .

**3** Starting at the end of the jig with the end cleat, position 56 of the 3/16×7/16×14" strips, best face down, on the jig where shown in Step 2 of the drawing. Place waxed paper under the first three and last three tambour strips. Use a pair of bar clamps to lightly clamp the strips against the end cleat to remove any gaps between the strips. Then, clamp a 1/8×2×12" stopblock in position to hold the strips tightly together.

**4** Mark a line 1" in from the tambour-strip ends, and spread a thin, even coat of glue on all of the strips between the pair of marked lines. Place a piece of 12×30" lightweight canvas on the glued strips where shown in Photo A on *page 52* and Step 2 of the drawing at *right*. Smooth out any wrinkles or bubbles in the canvas.

*Continued*


MAKING THE TAMBOUR
STEP 1
3/4 x 7/8 x 14" end cleat
14"
3/4 x 14 x 27 1/4" plywood bottom
28"
27 1/4"
3/4"
TAMBOUR CLAMPING JIG
7/8"
3/4"
14"
3/4 x 7/8 x 28" side cleats
3/4"
Waxed paper
Lightweight canvas
30"
Let excess canvas hang over on this end
*Keep glue 1" from ends
12"
Glue canvas to tambours
*1"
(56) 3/16 x 7/16 x 14" tambour strips (B)
3/4 x 1" CLAMPING BLOCKS clamped on ends of strips and 1/4" from edge
12"
*1"
7/16"
STEP 2
1/8 x 2 x 12" stopblock clamped on end of jig to hold strips tightly together
Waxed paper between tambour strips and CLAMPING JIG
CLAMPING JIG
3/4"
STEP 3
3/4 x 1 1/2 x 12"
3/4 x 12 x 24 1/2" plywood
Clamp plywood on top of waxed paper, canvas, and tambour strips, then remove CLAMPING BLOCKS applied in Step 2 from ends of strips




## Bill of Materials

| Part | Finished Size T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|
| A* shelves | 3/4" | 12 1/2" | 42" | EO | 3 |
| B* tambour strips | 3/16" | 7/16" | 14" | O | 224 |
| C support caps | 3/4" | 2 7/8" | 11 1/8" | PL | 8 |
| D uprights | 3/4" | 6 3/4" | 12 1/2" | PL | 4 |
| E backs | 1/4" | 37 1/2" | 14 1/2" | OP | 2 |
| F feet | 1 1/2" | 3 1/4" | 11 1/2" | LO | 2 |

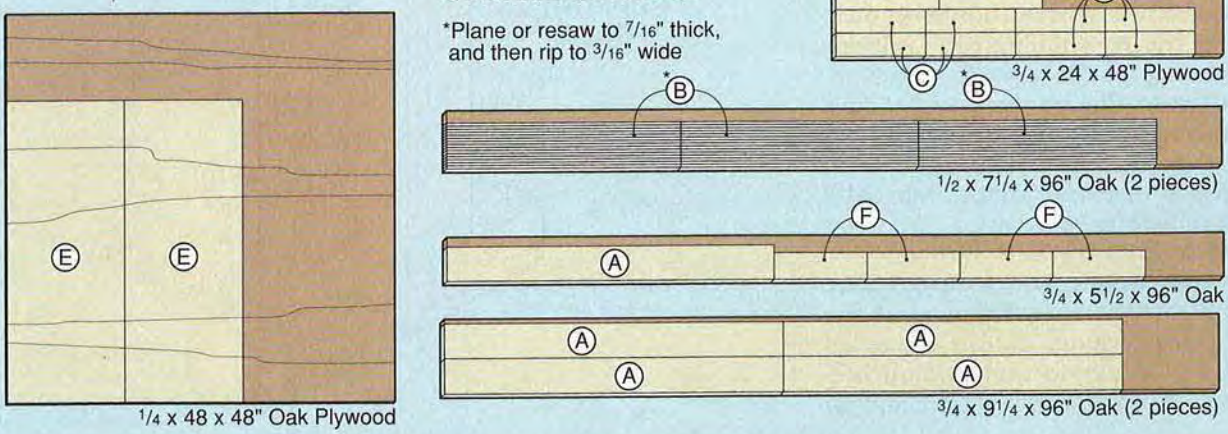
*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

**Materials Key:** EO–edge-joined oak, O–oak, PL–plywood, OP–oak plywood, LO–laminated oak

**Supplies:** lightweight canvas, #18x3/4" brads, #8x1 1/2" flathead wood screws, 1/4" threaded inserts, 1/4" all-thread rod, 1/4" flat washers, 1/4" lock washers, 1/4" wing nuts, stain, finish.

## CUTTING DIAGRAM

*Plane or resaw to 7/16" thick, and then rip to 3/16" wide


D D D D C
C *B *B
3/4 x 24 x 48" Plywood
1/2 x 7 1/4 x 96" Oak (2 pieces)
F F A
3/4 x 5 1/2 x 96" Oak
A A A A
3/4 x 9 1/4 x 96" Oak (2 pieces)
E E
1/4 x 48 x 48" Oak Plywood

**5** Cover the canvas with waxed paper. Next, clamp a piece of ¾×12×24½" plywood to the top of this assembly to press the tambour strips uniformly against the canvas as shown in Photo B and Step 3 of the drawing. Leave the assembly clamped overnight. Remove the clamps and tambour, and repeat to form the remaining tambour assemblies.

**6** Remove the tambour assembly from the jig, and sand the wood side of each tambour until the pieces are flush with each other and all machining marks are gone. (We first belt-sanded the tambour with 80 and then 120-grit sandpaper. Next, we used a palm sander and 150- and 220-grit sandpaper to finish-sand the tambour.)

## Build the tambour frames for a supporting role

**1** To build the tambour support frames, cut the support caps (C) to the shape shown on the Parts View drawing. Cut the uprights (D) to size.

**2** Using the Parts View drawing for reference, mark the centerpoints and drill four holes in each top and bottom support cap (C).

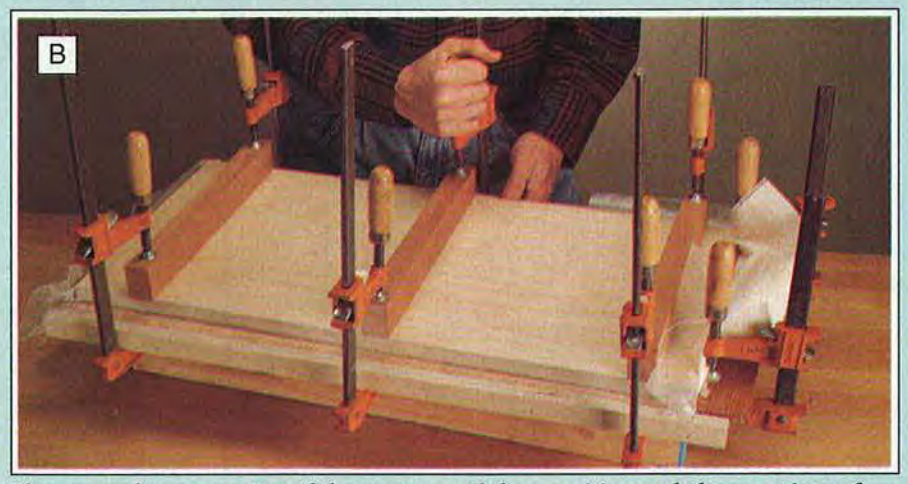
**3** Glue and screw the supports together in the configuration shown on the Tambour Support Frame drawing. (We used a framing square to check that the edges of the top and bottom caps [C] were perfectly aligned.)

**4** To wrap the tambour around the frames, drill 1/16" holes 3/8" from the ends of the first two tambour strips where shown on Step 1 of the Assembling the Columns drawing on the *opposite* page.

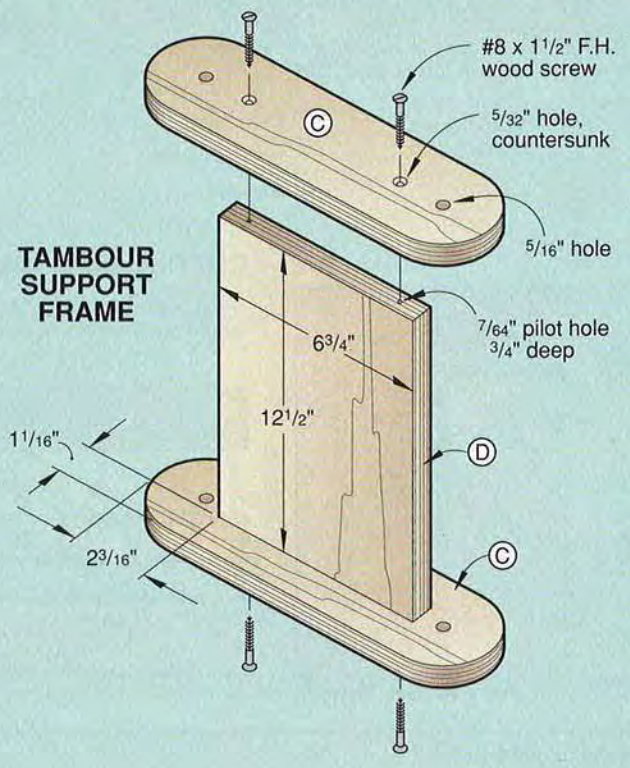
**5** Spread glue on the mating edges and wrap the tambour tightly around the frame where shown in Step 1 of the drawing. Start the first strip centered on the radiused ends where shown.

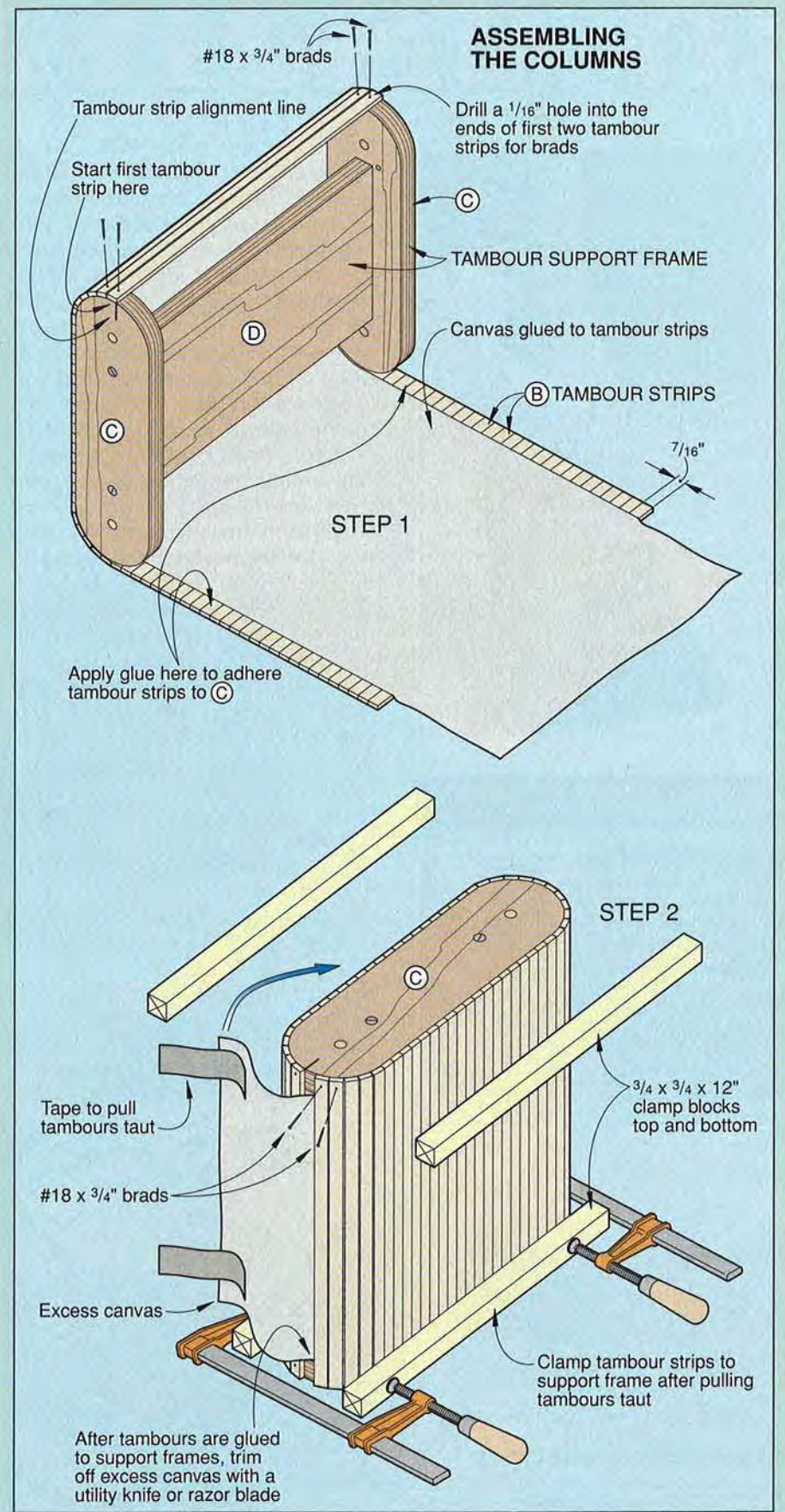
**6** After gluing and wrapping the tambour completely around the support frame, clamp a pair of clamp blocks to the top and bottom of the assembly where shown

**Clamp the oak strips to the clamping jig good face down. Spread glue between the clamping blocks, and adhere a piece of lightweight canvas to the strips.**




**Place waxed paper on top of the canvas, and then position and clamp a piece of plywood on top of the waxed paper to firmly secure the canvas to the oak strips.**




ASSEMBLING THE COLUMNS
#18 x 3/4" brads
Tambour strip alignment line
Start first tambour strip here
Drill a 1/16" hole into the ends of first two tambour strips for brads
Ⓒ
TAMBOUR SUPPORT FRAME
Ⓓ
Canvas glued to tambour strips
ⒷTAMBOUR STRIPS
Ⓒ
7/16"
STEP 1
Apply glue here to adhere tambour strips to Ⓒ
STEP 2
Ⓒ
Tape to pull tambours taut
3/4 x 3/4 x 12" clamp blocks top and bottom
#18 x 3/4" brads
Excess canvas
Clamp tambour strips to support frame after pulling tambours taut
After tambours are glued to support frames, trim off excess canvas with a utility knife or razor blade

in Step 2 of the drawing *below left*. The clamp blocks hold the ends of the tambour strips flush while the glue dries. Repeat the process to form each column. Drive brads into the last two tambour strips in the wrap to hold them firmly in place.

**7** Using a hobby knife, trim the excess canvas from each column. Set the brads, and fill the holes with putty. Sand smooth.

**8** Belt-sand the top and bottom surfaces of the column flush. Hand-sand a slight round-over on the exposed edges of the tambour pieces where they wrap around the frame radiused ends.

## Cut the backs, and put the pieces together

**1** From ¼" oak plywood, cut the backs (E) to size. Notice that the grain runs up and down on the backs where shown on the Exploded View drawing.

**2** Cut two pieces of ¾"-thick stock for each foot (F) to the shape shown on the Parts View drawing. If you don't have a 2" Forstner bit to form the holes in the bottom pieces, drill blade start holes and cut the openings with a scrollsaw or jigsaw. Glue the pieces face-to-face with the edges and ends flush. Sand the edges smooth.

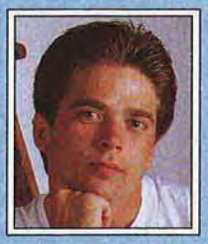
**3** Drill 5/16" holes through each foot where shown on the Parts View drawing.

**4** Finish-sand all of the pieces. Stain the components and apply a clear finish.

**5** Using a hacksaw, cut two 31¼"-long pieces of ¼" all-thread rod. Assemble the bookcase in the configuration shown on the Exploded View drawing. To prevent scratching the floor, make sure that the bottom of the all-thread is above the bottom surface of the feet where shown on the Hole detail accompanying the Exploded View drawing. Trim the all-thread rod more if necessary.

Produced by Marlen Kemmet
Project Design: Parman Brothers LTD., Johnson, Kansas
Illustrations: Kim Downing
Photographs: John Hetherington

# BRUSH BASICS



**Professional painter Wade Sundeen tackles much of the finishing work for projects that appear in both *WOOD*® magazine and our sister publication, *Weekend Woodworking Projects*®. Many times, he brushes on a paint or varnish, with results that rival the smoothness of sprayed finishes. Read on and discover how you, too, can apply finishes like a pro.**

## First things first: Buy the right brush

With price tags in the $10–$25 range, high-quality brushes don't come cheap. So, the temptation to buy a less-expensive brush in the $1–$10 range can be quite strong. Our advice: Buy the best available brush and you will be rewarded many times over in better results and time savings. And remember, high-quality brushes will last years if you take care of them properly. (We'll cover this important topic in depth later.)

As shown *below*, you can buy brushes with either synthetic bristles (nylon, polyester, or a nylon/polyester blend), or natural (animal hair) bristles. Remember to purchase synthetic-bristle brushes for water-based finishes and latex paints, and natural-bristle brushes for oil-based varnishes, polyurethanes, enamels, and brush-on lacquers. The reason: Because of their pores, natural bristles will absorb loads of water, making them puffy and hard to control. And, oil-based finishes will attack and break down synthetic bristles.

During use, a 3" brush will sprawl to about 4" wide.

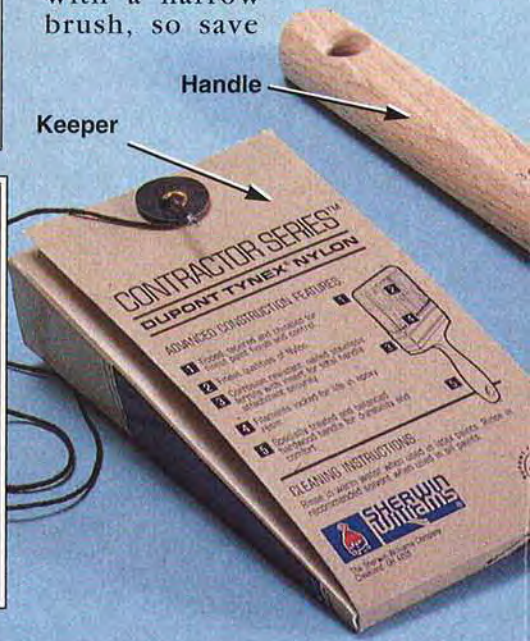
A high-quality brush (*left*) has finer flags and a smoother taper than a low-quality brush (*right*).

Although brush manufacturers use the hair of many animals, including skunks, horses, badgers, and oxen, you only need commonly found black or white China-bristle brushes (made from hog's hair) for most finishing tasks. It makes no difference if you use black or white, but many professionals use black-bristled brushes for paints, and white for clear finishes, just to keep them separate.

You can buy brushes from 1" to 4" wide in ½" increments, but you'll rarely need a brush wider than 3". You'll have better control with a narrow brush, so save

White China bristle  Black China bristle  Angled nylon  Nylon/polyester blend

**Here's a look at commonly available brush types**



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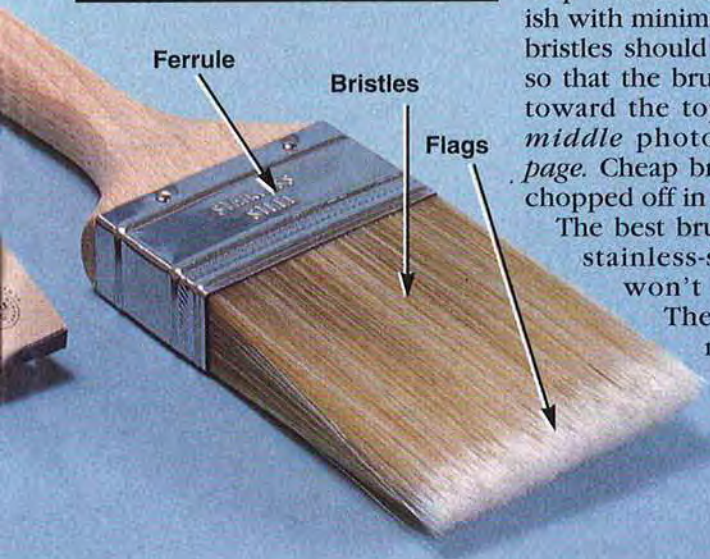
# How to select, use, and clean this trusty finishing tool

### When to use something other than a good brush

At times, it just doesn't make sense to use a good brush. One such situation is when you're working on a project so small that it takes you more time to clean a brush than it does to apply the finish. Then, use inexpensive disposable bristle brushes or foam brushes (we especially like the latter for applying stains). Or, get an exceptionally smooth coat with an aerosol finish.

A cutting pot serves as a handy container during finish application and brush cleanup.




the larger sizes for big projects such as tabletops. Keep in mind that a brush will sprawl, meaning it will fan out when you use it as shown *opposite page*. So, a 3" brush will actually cut a swath about 4" wide. Wade Sundeen typically chooses a 1"-wide brush for moldings, spindles, and other areas with tight spots, a 3" brush for large surfaces such as tabletops and doors, and a 2"-wide brush for surfaces between these two extremes. For most woodworking applications you can get by with 1" and 2" brushes.

Finally, you can buy brushes with the bristles cut either perpendicular to the handle (straight brush) or at an angle (sash brush). Use a straight brush for most tasks, and save the sash brush for times when you have to reach into corners and other tight spots.

### Here's what makes a high-quality brush

You'll have an easy time finding the best brushes at your local hardware or paint store—they cost the most. But what separates them from the less-expensive brushes? Here's a top-to-bottom analysis of what to look for in a good brush.

Although split ends may not look good in your own hair, these flags help a brush smoothly spread finish with minimal brush marks. The bristles should be varying lengths so that the brush smoothly tapers toward the top as shown in the *middle* photo on the *opposite page*. Cheap brushes have bristles chopped off in distinct layers.

The best brushes have durable, stainless-steel ferrules that won't rust or fall apart. The ferrule should be nailed or screwed to a wooden handle that's long enough to give the brush good balance. Although less-expensive brushes come without a package, or in a throwaway container, high-quality brushes have reusable keepers for maintaining the shape of the bristles during storage.

### Let's brush up on some basic techniques

Even the best brush won't do you much good unless used correctly. These tips will help you get smooth results job after job:

- Unless you intend to use all of the finish in a container at once, pour only what you'll need for the job at hand into a cutting pot (a fancy term pros use for an empty can). This way, the debris picked up by the brush won't contaminate the original container.

- Wade prefers old paint cans, the type with plastic tubes on the handles for comfort. He cuts off the indented rim of the pot with a can opener so that finish doesn't collect there, and holds it as shown *left*, with his thumb securely around the plastic tube.

- If you must pour unused finish back into its original container, always strain the finish with a commercial strainer (available at paint stores) or an old nylon. With water-based clear finishes, you must strain them before each use to keep coagulated chunks of the finish off your project.

- To get a super-smooth appearance, add a paint conditioner to your finish before applying it. These products help the finish flow uniformly without causing runniness or decreased coverage as thinners might. They also reduce the drag on brushes or rollers, and make finishes flow

*Continued*

# BRUSH BASICS

through spray equipment with greater ease.

Wade uses Penetrol with oil-based finishes, and Floetrol with latex paints. (The Flood Company manufactures both products. Call 800/321-3444.)

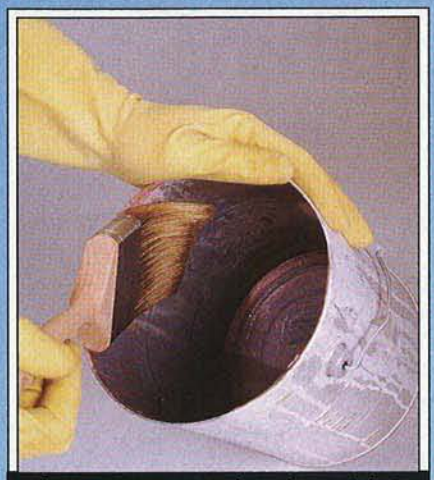
He adds about one ounce of each product to a quart of finish, and may increase the percentage for thick-bodies finishes. You can buy the products at paint stores such as Sherwin-Williams and Glidden, and at many hardware stores. For water-based clear finishes, use the manufacturer's recommended flow-out additive.

• Never dip the bristles more than halfway into the finish. Doing so overloads the brush and increases the chances of the finish running onto the ferrule and your hand.

• Place the brush in a plastic bag during short breaks as shown *opposite page* to keep the finish from drying out. Doing this also saves you one more cleaning.

• Let's face it: there's little mystery to the method of stroking a paintbrush back and forth. Just hold the brush in a comfortable position, and keep an eye out for drips and runs. After applying a finish, lightly drag the tips of your brush through it. This technique will usually decrease the size of the brush marks.

• Carefully plan the sequence in which you brush the parts of your project. Generally, it makes sense to start with the parts farthest away from you (such as the inside of a cabinet) so that your clothing doesn't touch wet areas as you brush. If a project has painted and clear-finished surfaces, apply the clear finish first. Then, you can cleanly wipe up a spilled drip on a clear area.

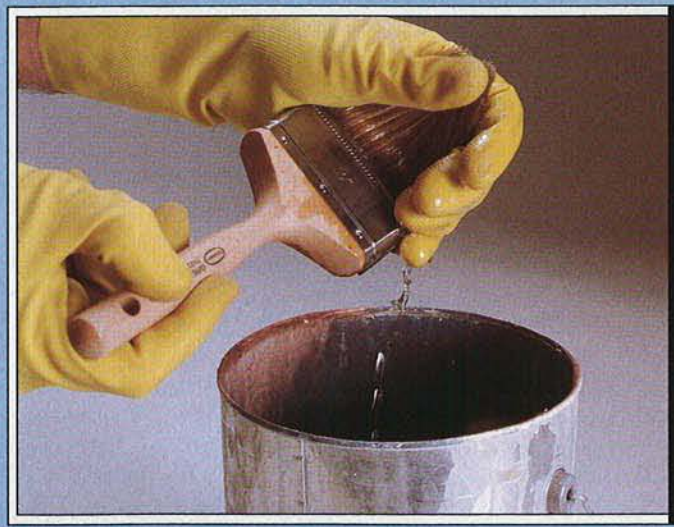


**1** To rinse your brush, swish it side-to-side as you pull it up the inside of the cutting pot.

## A surefire system for cleaning and storing brushes

To keep his brushes as good as the day he bought them, Wade follows this five-step cleaning and storage process:

**2** When cleaning off dried finish, push the wire brush in one direction only: away from the handle.



**3** Gently wring out the bristles as shown. Repeat Steps 1 and 3 until the solvent runs clear.

**Step 1:** Pour all of the remaining finish out of your cutting pot and add solvent (water for water-based finishes, or the appropriate solvent for oil-based products) to a depth of about ¼". Gently pull the brush up the sides of the pot as shown *top* and move it from side to side to clean it and the pot. Do not mash the bristles!

**Step 2:** Fast-drying finishes may become crusty and resist your rinsing. At these times, use a wire brush to clean this residue off of

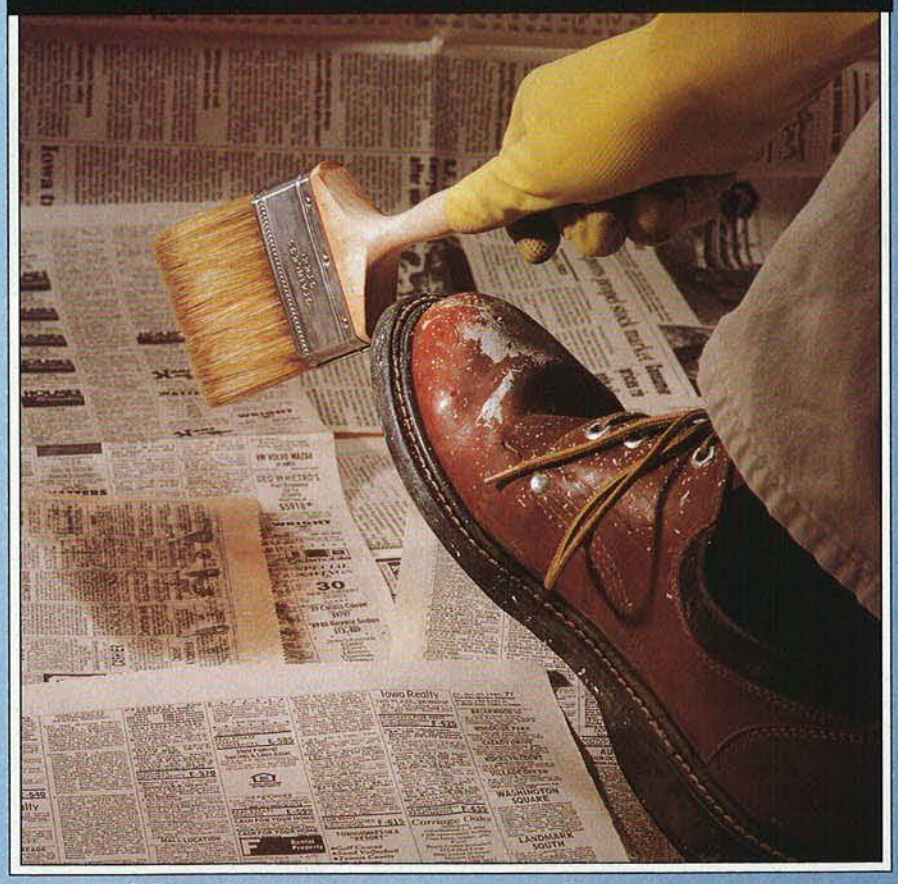
the ferrule and bristles. To do so, push the wire brush toward the tips of the bristles as shown *opposite page, middle.* Skip this step if your brush has no dried finish on it.

**Step 3**: Gently wring out the bristles as shown *opposite page, bottom.* Repeat Steps 1 and 3 at least three more times, or until the solvent runs clear.

**Step 4**: Knock out the last traces of solvents by tapping the brush against the toe of your boot as shown *below.*

**Step 5:** Run a brush comb (available at paint stores) through both sides of the brush, pushing it away from the handle as shown *below right.* Repeat this step three or four more times to straighten the bristles and keep them from matting together.

**4** **Knock the last traces of finish out of the brush by rapping its handle against the tip of your shoe.**



**5**

**A brush comb can help you keep the bristles straight and prevent matting.**

Gently dry off the brush (so it's damp, not wet) with a rag and replace it in its keeper. Hang the brush until you use it again.

**Tip:** Wade suggests that you never rinse out a natural-bristle (animal hair) brush in water, or a synthetic-bristle (nylon or polyester) brush in mineral spirits. Doing so may damage the bristles and cause them to puff out, making them less effective.

Written by Bill Krier with Wade Sundeen Photographs: Hopkins Associates

# SNAPPY THE TURTLE

**Oklahoma woodcarver Bob Grufik could easily call his turtles snappers—folks just snap 'em up at carving shows. Here's how to carve one of Bob's popular little creatures for yourself.**

Transfer the full-sized body top view, *opposite page*, including the lengthwise centerline, to your carving stock. Cut out the blank with a bandsaw or scrollsaw.

Along each edge of the blank, draw a line between the neck and the tail, ½" from the top. Mark a line along the edge of the head and neck about 3⁄16" from the top, and another on the tail, 5⁄8" from the top, where shown *below*.

Carve the head and tail to thickness. First, stop-cut where indicated by the dotted lines on the Turtle Blank drawing. Then carve the head and tail down to the depth line drawn around the edge. Leave the top surfaces flat.

## Shape the turtle's shell

Next, rough out the shell. Starting between the arrowheads on the centerline, slope the surface down and away from the centerline to the line on the edge of the body. The no. 7 and no. 5 gouges work fine for establishing the rough shape. Take deep cuts with the no. 7 to remove wood quickly, shallower cuts with the less-curved no. 5 for finer shaping.

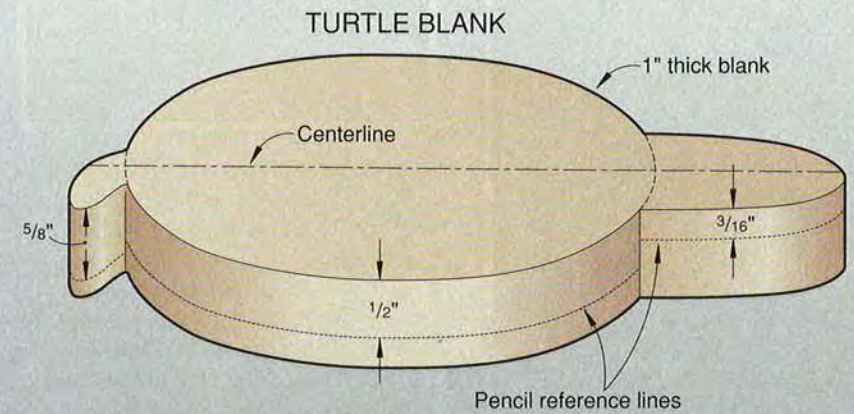
Control cutting depth by taking advantage of the tool's beveled edge. With the beveled part of the gouge blade rubbing against the wood, raise or lower the tool's handle to vary the depth of cut.

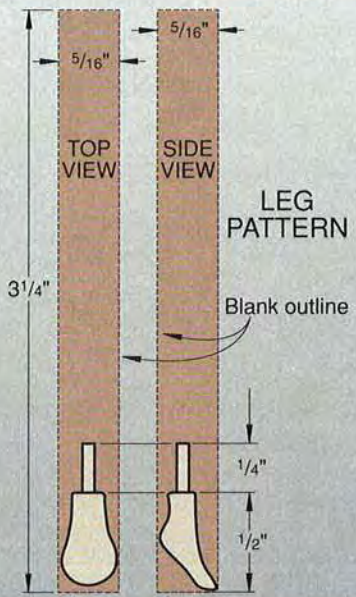
Beyond the arrows, carve toward each end, leaving a ridge about 1" long at the center of the shell. You won't be able to carve much at the front yet, but you can begin to form an arc in the shell over the turtle's neck.

Carve the shell surface slightly concave, as shown in the Body Front Section View. And don't worry about getting both sides of the shell exactly alike; perfect symmetry ranks right up with a vacuum on the list of things Mother Nature abhors.

As you work from the sides of the shell to the front and back, you'll encounter changing wood-grain direction. Going against the grain

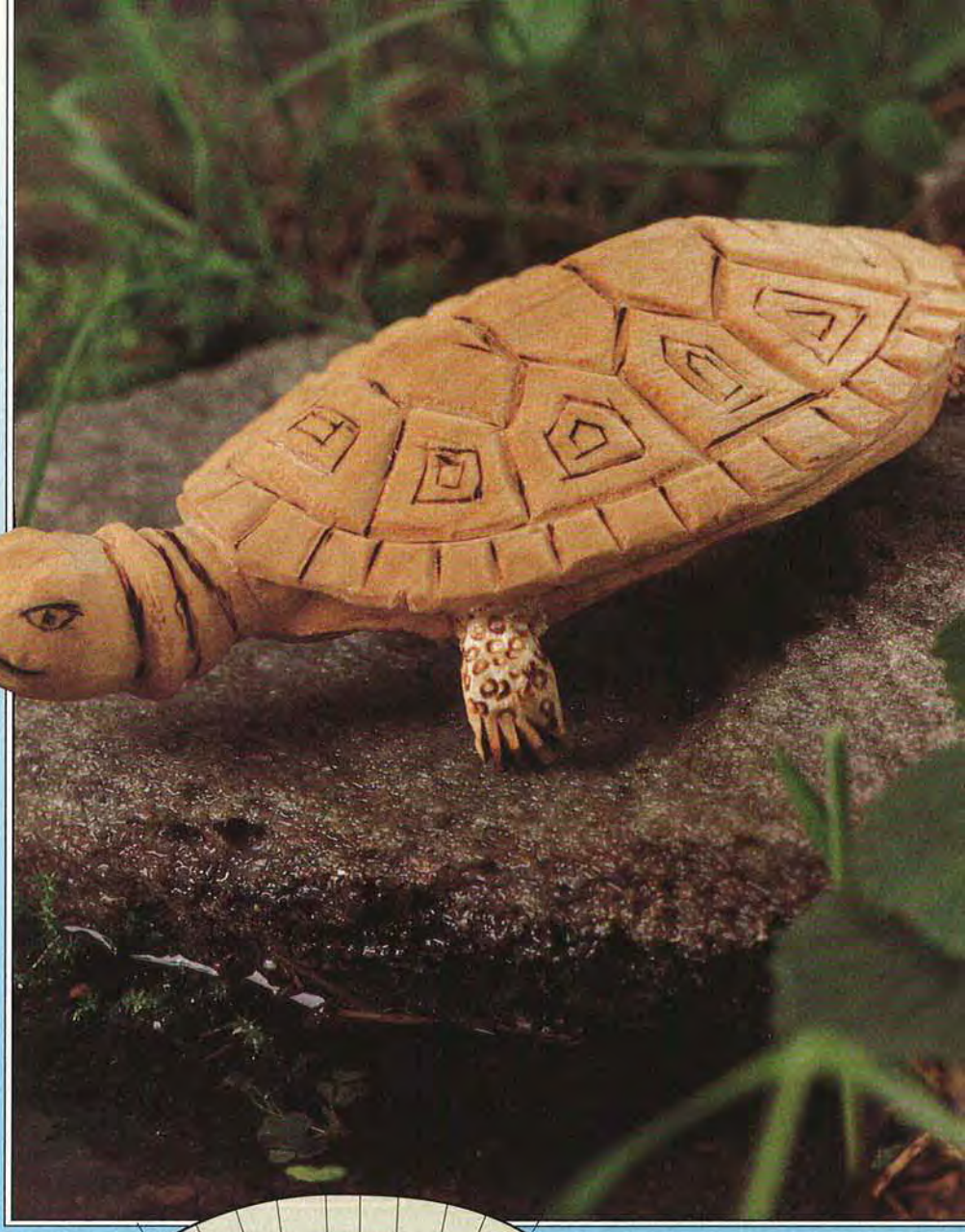
*Continued*




Print this article

# CARVE THIS TORTOISE IN NO TIME FLAT



## Tools and supplies

**Stock**

Basswood, butternut, or other carving wood
1×2¾×5"

**Gouges**

10mm no. 7 palm
8mm no. 5 palm
3mm no. 11 U-veiner

**V-Tools**

3/16" no. 13 (90°)
1mm no. 12 (60°)

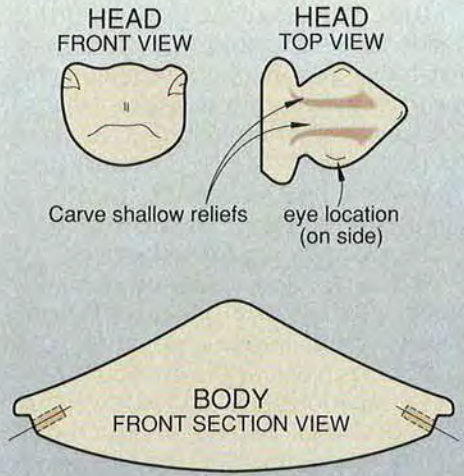
**Knives**

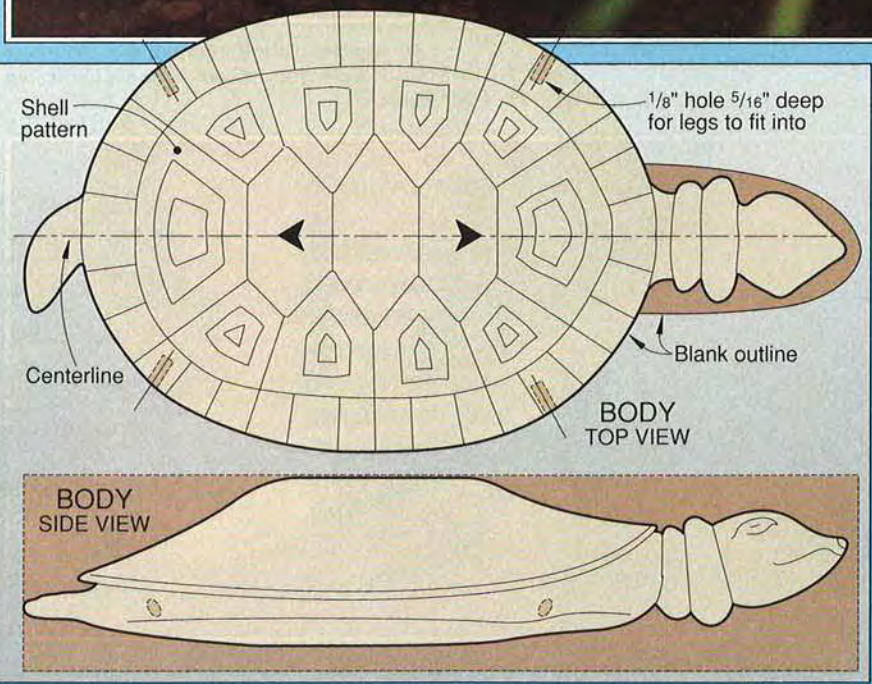
Bench knife

**Finishing supplies**

Optional: woodburning tool, acrylic paints

## FULL-SIZED PATTERNS



leaves a rough surface, and you could dig in and break out a chunk of your carving. To avoid that, alter your position or turn the carving (sometimes you'll need to do both) so you're always cutting with or diagonally across the grain. In end grain, make shallow shaving or planing cuts.

By this stage, your turtle's shell should look somewhat like a tiny circus tent that's billowing up at one end. Smooth the surface—make it reasonably smooth, not too smooth with the no. 5 gouge and your knife. Just remove the deepest of the gouge marks in the surface, and create a relatively even edge.

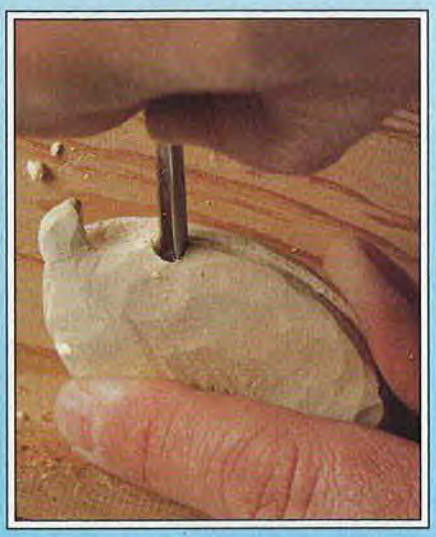
## Take a little off the sides

Now, form the overhanging rim of the shell by cutting back the edge of the turtle's body. Mark the line of the shell by rubbing the side of your pencil lead around the corner of the shell. Draw a line parallel to the marked edge and about 1/16" below it.

With one wing of the large V-tool against the side of the body and the tool's corner on the line, carve away the lower part of the body, as shown *below*. Undercut the edge of the shell by about 1/8" at the sides and over the tail, but not at the front just yet. Around the tail, stop-cut, then carve from the bottom of the turtle with your knife. An X-acto knife with a no. 11 blade comes in handy for carving between the tail and the shell.

Bore holes for the legs where indicated on the body drawings, placing the top of each hole right under the rim of the shell. Angle the holes toward the front or back as shown, and aim each one upward, roughly parallel to the slope of the shell.

The 3mm U-veiner will do the job; just rotate it as you push the end straight into the wood, shown *below*. Go about 1/4" deep. Clean out the hole with the tip of your knife.



**As you push the U-shaped no. 11 gouge into the wood, rotate it to drill the leg holes.**

**Carve the overhanging edge of the shell with a V-tool.**

## Pare the rings around the neck

Starting about 5/8" back from the point at the front of the head, pencil in the neck rings and head (the tinted area of the pattern). Refer to the Body Side View, and sketch in the head and neck on the edge of the blank.

Round the neck to about 5/8" diameter, re-marking the locations of the rings as you carve. Now, form the rings, starting with the large one. Stop-cut the line between the head and large ring and the one between the rings. Then, with your knife, make angled slicing cuts from the middle of the ring down to the stop cuts on each side.

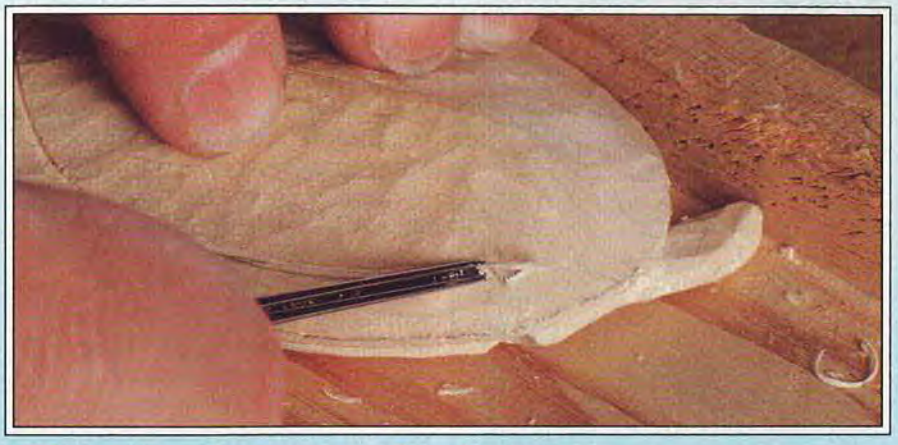
Similarly cut the back of the head to form a V-groove between the head and the ring. Carve the smaller ring using the same method. You should now have two roughed-out rings with a narrow V-groove between them, as shown *opposite page, bottom.*

Shave the front of the sloping shell top so the surface stands about a rim thickness above the neck. Form the slight arch over the neck, and then complete undercutting the shell on the front of the body. Carve a sharp V-groove (actually, more of a half-V) where the neck joins the body.

## Make both ends neat

With the turtle neck shaped up, turn your attention to the head. Study the head in the top- and side-view illustrations. Notice that it looks almost like a pentagon in the top view, but more like a slightly misshapen bullet in side view. The turtle is looking upward, so the top of the head and the straight portion of the bottom angle up from the neck.

Shape the long curve on the bottom of the head. Then round off the bottom corners, creating a U-shaped cross section. Mark the eye locations on the sides of the head, and carve from behind them back to the neck on the sides and top. Starting from in front of the



V-tool cuts delineate the pattern on the turtle's shell.

eyes, bring the head to a point. Re-carve the rounded bottom corners, as necessary.

On top of the head, carve two shallow lengthwise reliefs on either side of the center (lifting out a thin shaving with the tip of your knife works best). Blend the resulting ridge into the top of the head and on out to the nose. At the same time, form the two eye bulges atop the head.

Round the edges of the tail, and gently curve the bottom of the turtle. Carve from the center of the bottom to each edge, reducing the thickness of the body at the edge below the overhanging shell to about ⅛". Round the bottom corners, and blend in the neck and tail.

## Add some sturdy turtle legs

With the wood grain running the length of the turtle, the legs would be carved across the grain if carved as part of the body. Thus, they would be fragile and weakly attached. Separately carved legs with the grain running lengthwise solve the problem.

Lay out the legs on four pieces of 5/16"-square stock about 3" long (for ease of handling). You can whittle the leg stock from the scraps left over when you cut out your blank.

Sketch the leg side view onto one face of each piece. Slice off the angled end first, then carve the leg to shape with your knife. Make the feet about 5/16" wide, and shape the legs to an oval cross-section ¼" wide and 3/16" thick.

Whittle the long end to a tenon that fits into the leg holes on the body. Cut each tenon to about ¼" long, and fit the leg to the body. Glue the legs into the holes with woodworker's glue or cyanoacrylate adhesive.

Blend the legs into the body. Inspect the carving, and clean up any fuzzy areas or rough cuts. Sand as necessary. To maintain the look of hand-carving, don't sand all of your tool marks away.

## Finish it your way

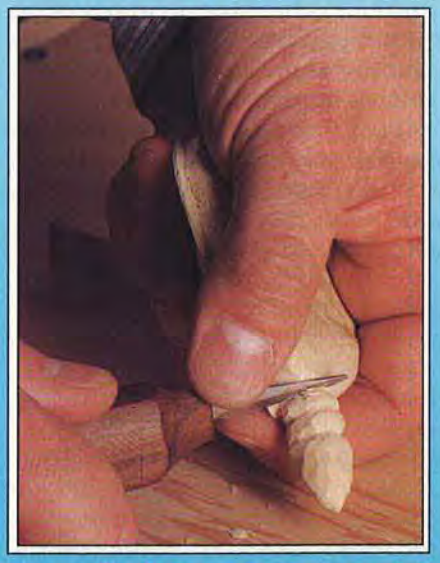
Now, you have a number of choices for finishing your turtle. You can paint the carved, sanded turtle in realistic or fanciful colors. Or, carve the shell with the decorative motif shown. You can further dress up the carved shell with stain, paint, or woodburning.

To carve the design shown, draw the pattern onto the turtle's shell. Carve the lines with the small 60° V-tool. Be careful of the changing grain direction as you V-tool the lines, shown *above left*.

The radial lines near the rim pose a problem: You'll probably break a chunk from the edge of the shell when you cut toward the unsupported edge with the V-tool. For best results, carve those lines with your knife. Holding the knife at a 60° angle to the surface, cut carefully along the line toward the edge. Then, starting at the rim, cut along the line in the other direction to slice out a V-shaped groove without any damage to the shell edge.

Accent the carved design with woodburned lines in the bottoms of the V-grooves. Also woodburn rings on the tail, the V-grooves on the neck, the toes (burn deep enough to actually separate the toes at the ends), the speckles on the legs, and the mouth and eyes.

For a painted turtle, use acrylic colors. Thinned paints applied over bare wood will yield a muted, aged look. For brighter colors, coat the carving with white acrylic gesso or similar undercoat first, then paint.



V-shaped knife cuts separate the turtle's neck rings.

Project Design: Bob Grufik Illustrations: Kim Downing Photographs: John Hetherington Written by Larry Johnston

# What woodworkers need to know about...

# CYANOACRYLATE

Print this article

Try clamping some of those joints! One advantage of cyanoacrylate glue: You can bond parts almost instantly without clamping.

**Some woodworkers speak of "instant glue" and "hot glue" when they talk about cyanoacrylate adhesive. That's not just because the real name looks like such a tongue-tangler (It's not; just say *sigh-anno ack-rill-late*). It's because those nicknames describe the stuff so perfectly.**

**Fast, strong, and—once you get the hang of it—easy to use, cyanoacrylate (CA) adhesive has met a growing array of industrial needs for decades. Now, home woodworkers are benefiting from this hot-shot adhesive.**

## Just what is this stuff?

Cyanoacrylate ester, instant glue's active ingredient, derives from acrylic acid, a versatile chemical that figures in products as diverse as sweaters and shower doors. CA glue, a watery liquid, can be compounded with thickeners for added body. Curing by chemical reaction occurs in seconds with thin CA, but may take up to a minute in thickened formulations.

Full bond strength can reach 5,000 psi (about 40 percent stronger than yellow glue) on a clean, dry surface. As with other adhesives, damp, dirty, or oily surfaces reduce bond strength.

## Here are three keys to success with CA glue

•*Choose the right formulation.* You can choose from among three types of instant glue: regular CA, a thickened gap-filling variety, and super gap-filling glue, an even thicker version .

Regular CA works great on tight-fitting joints, but we have found the medium-viscosity gap-filling type best for all-around woodworking. (But don't count on gap-filling CA to make up for sloppy joinery. The glue bridges only those gaps measured in thousandths of an inch, such as slight surface imperfections.)

•*Apply it correctly.* Don't go overboard when applying CA; it doesn't respect the "more's better" rule. The ideal application rate: one drop of glue per square inch of joint. Too much leads to longer curing times or no curing.

Use CA glue at room temperature, applying it to one side of the joint only. A spiral pattern works well when gluing large parts, a squiggly line for narrower pieces. Make a tighter spiral or closer squiggles when the adhesive readily soaks into the wood; widen your pattern to apply less glue on less porous surfaces.

•*Use an accelerator.* Buy a pump-spray bottle of accelerator along with the glue; you'll save a lot of frustration and make better joints. Some makers offer standard and super-strength accelerators; the standard one handles most jobs.

And go easy! Don't wet the wood with accelerator. Don't wet uncured glue with it, either. Mixing them starts a sizzling, bubbling reaction that ends in a weak bond. White, crystalline-looking glue lines mean you're probably overdoing the accelerator.

**A good joint, like the one holding the two pieces of bird's-eye maple together, will be virtually invisible.**

## Three sure strategies for joining wood with CA glue

•*Accelerator first.* Spray a mist of accelerator onto the mating surface of one piece (Part A). When it dries (it will in a flash), apply glue to Part B. Join the parts and hold until the glue cures. (Shown in the three photos, *right.*)

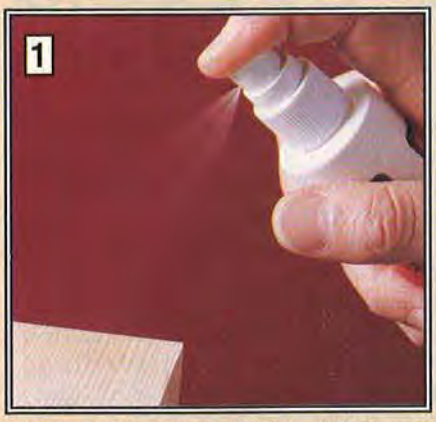
You probably won't have time to reposition the parts before the glue cures. If you need adjustment time, use the next method.

•*Accelerator last.* Apply gap-filling glue to one mating surface and assemble the parts. (Don't try to wipe away squeeze-out—you'll most likely glue your finger or

# ADHESIVE

For precise alignment, hold parts together and let regular cyanoacrylate seep into the joint. A shot of accelerator speeds up curing.

## Make a perfect joint by following these three steps:




Spray accelerator on Part A. A light mist is all that's needed.

Next, apply glue to Part B of the joint. Gap-filling glue shown works great for most woodworking joints.

Finally, assemble the parts. Hold with hand pressure until glue cures, usually in a few seconds

wiping rag to the project.) Align the pieces, then mist the edges of the joint with accelerator. Hold until the glue cures.

•*The seep-in method.* Join tight-fitting, precisely aligned parts with standard thin CA glue. Spray accelerator on the joining surface of one piece, and assemble the parts. Hold them together, and apply thin CA along the joint line as shown *above*, allowing it to seep into the joint. Wait about 10 seconds for the glue to cure.

### You can unglue, too

You already know that this stuff will glue your fingers to the project, to each other, or to almost anything else within reach. So, be careful, but be prepared. Buy some debonder, a solvent for CA.

In addition to undoing accidents and cleaning up, debonder lets you separate parts that have been glued together. Simply apply it to the joint. The parts will separate cleanly, but not quite as quickly as they went together.

### Where to get it and store it

Woodworking stores, mail-order tool and supply houses, and crafts-supply dealers sell CA glue, accelerator, and debonder/solvent. The glue costs about $10 for a 2-oz. bottle (the size shown in the photos); accelerator, about $5 for 3 oz. (the size shown); debonder, about $6 for 2 oz. A 3-oz. bottle of accelerator should be enough for a 2-oz. bottle of glue.

A 2-oz. bottle of CA glue has a shelf life of about one year at room temperature, two years for a new bottle stored unopened in your freezer. Don't, however, refrigerate glue that has been opened; that will introduce moisture and shorten shelf life.

## WHAT CAN I DO WITH IT?

Here are some places where CA will shine in your shop. You'll discover plenty more as you go.

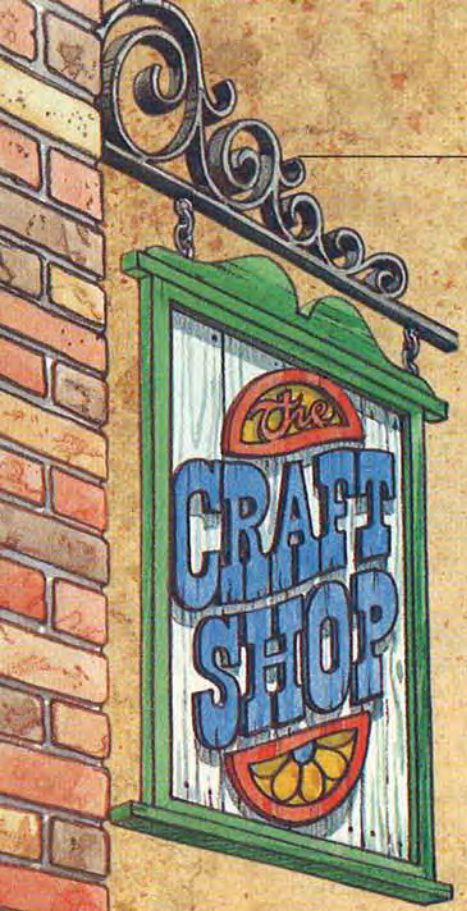
•**Project building.** Assemble mitered joints, glue splinters or splits, attach moldings, and bond other materials to wood.

•**Jigs and fixtures.** With CA, you can stick shop aids together instantly rather than waiting hours for ordinary glue to dry before you can use a jig.

•**Woodturning.** Glue turning stock to an auxiliary faceplate for a no-delay start on a turning.

•**Woodcarving.** Before carving delicate areas, soak the wood with CA to strengthen it.

Photographs: John Hetherington




# WHAT A SHOW-

## A grand display for small items

**Combine a plastic box with our simple walnut base and top for the perfect way to exhibit—and protect—a small collectible. This rich-looking showcase creates a perfectly elegant display, highlighting whatever you put inside.**

Print this article

*You'll need a 3 7/16 × 3 7/16 × 4 7/16" clear-plastic show box, available from many craft-supply dealers or our Buying Guide source.*

First, machine the base (A). Tilt your tablesaw blade 45° away from the rip fence. With the fence 5" from the blade (at table level), saw chamfers on both edges and both ends of one side of the stock, best face down.

Install a ⅜" core-box bit in a table-mounted router. Refer to the Routing the Base drawing, and rout both edges and both ends on the unchamfered side of the base.

The resulting four grooves delineate a square at each corner of the base; these squares serve as legs. Rout out the waste between the legs with a ½" hinge mortising (or straight) bit. Set the cutting depth to ¼", and move the fence to 1⅜" from the bit center.

Rout with each edge and end of the base against the fence. Move the fence about ½" farther from the bit, and rout again. Continue until only the feet remain. Sand the base smooth.

Now, remove the lid from the 3 7/16 × 3 7/16 × 4 7/16" clear-plastic box. Miter-cut four stops (B) to fit snugly around the rabbeted box top. Assemble the four stops, gluing the miter-cut corners with cyanoacrylate glue. Glue the assembly to the base.

With the base completed, turn to the top. First, saw a ⅝" 45° chamfer along each edge of a ¾ × 6 × 12" piece of stock. (We started with stock this size for safety and convenience.)

Then, install a ¼" straight bit in the table-mounted router. Refer to the Routing the Top drawing, and machine the chamfered side of each edge. Rip 1¼" from each edge, forming two pieces of stock for the top segments (C).

Tilt the tablesaw blade to 22½°. Bevel-cut four facets, forming a shallow peak on one end of a 1¼ × 1¼ × 12" workpiece. (Laminate stock, or use a turning square.) Crosscut 1⅛" from the tip to make part D.

Miter-cut four top segments (C) to fit tightly around the top ornament (D). Glue the parts together, clamping them with a heavy rubber band. When dry, sand the bottom side flush, and finish-sand.

Finish the base and top assemblies. Center the bottom of the plastic box on the underside of the top, drill where shown, and drive in a roundhead brass wood screw from inside the box.

### Buying Guide

**Plastic box.** Clear plastic box, style no. SM-1209, $6.45 ppd. in U.S. Althor Products, 996 Danbury Rd., Wilton, CT 06897, 800/688-2693

**Photograph:** John Hetherington
**Illustrations:** Kim Downing
**Project Design:** Larry Johnston

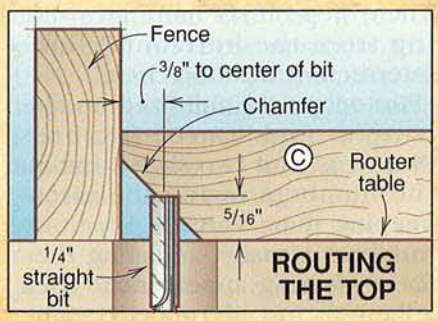
**Bill of Materials**

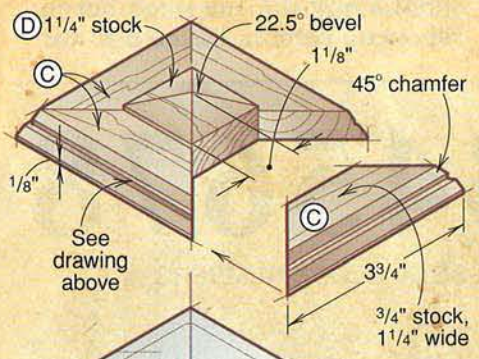
| Part | Finished Size T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|
| A base | ¾" | 5⅜" | 5⅜" | W | 1 |
| B* stops | ¼" | ½" | 4 7/16" | W | 4 |
| C* top segments | ¾" | 1¼" | 3¾" | W | 4 |
| D* ornament | 1¼" | 1¼" | 1⅛" | W | 1 |

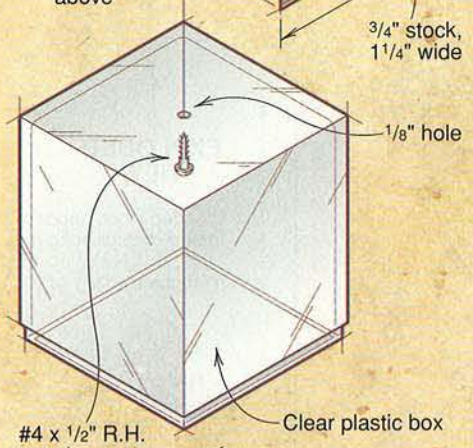
*Make these pieces longer initially; cut them to finished length in accordance with the how-to instructions.

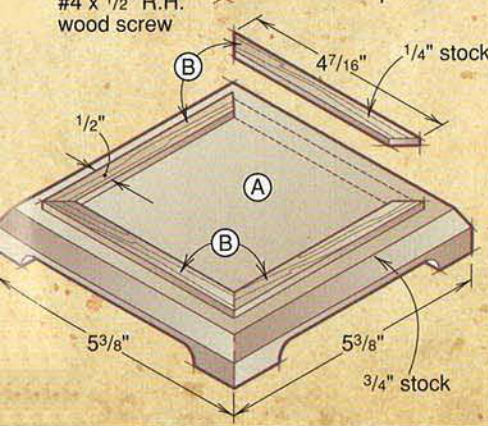
**Material Key:** W-walnut

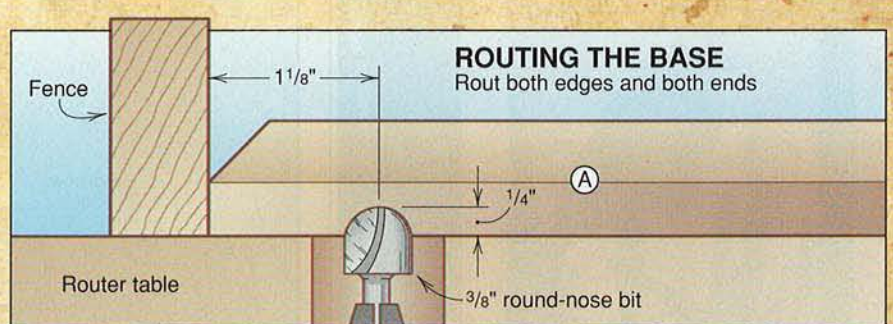
# -OFF!

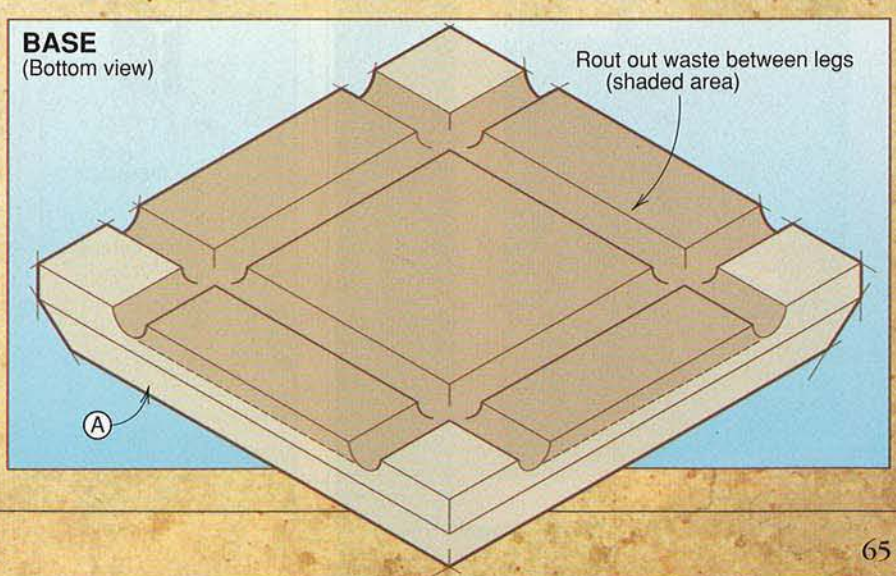

Fence
3/8" to center of bit
Chamfer
C
Router table
5/16"
1/4" straight bit
ROUTING THE TOP


D 1 1/4" stock
22.5° bevel
C
1 1/8"
45° chamfer
1/8"
See drawing above
C
3 3/4"
3/4" stock, 1 1/4" wide


1/8" hole
#4 x 1/2" R.H. wood screw
Clear plastic box


B
4 7/16"
1/4" stock
1/2"
A
B
5 3/8"
5 3/8"
3/4" stock


ROUTING THE BASE
Rout both edges and both ends
Fence
1 1/8"
A
1/4"
Router table
3/8" round-nose bit


BASE
(Bottom view)
Rout out waste between legs (shaded area)
A

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CRAFT SHOP

# WETLANDS

## A SIMPLY STYLISH CLOCK WITH

**You can wade right into this project without any fear of getting in over your head. Our heron clock goes together quickly and simply, and it looks great standing on a shelf or hanging on the wall.**

Cut parts A and B 1" longer than the sizes shown in the Bill of Materials. On each inside face, ¾" from the front edge, saw or rout a ¼" groove ⅜" deep for part C.

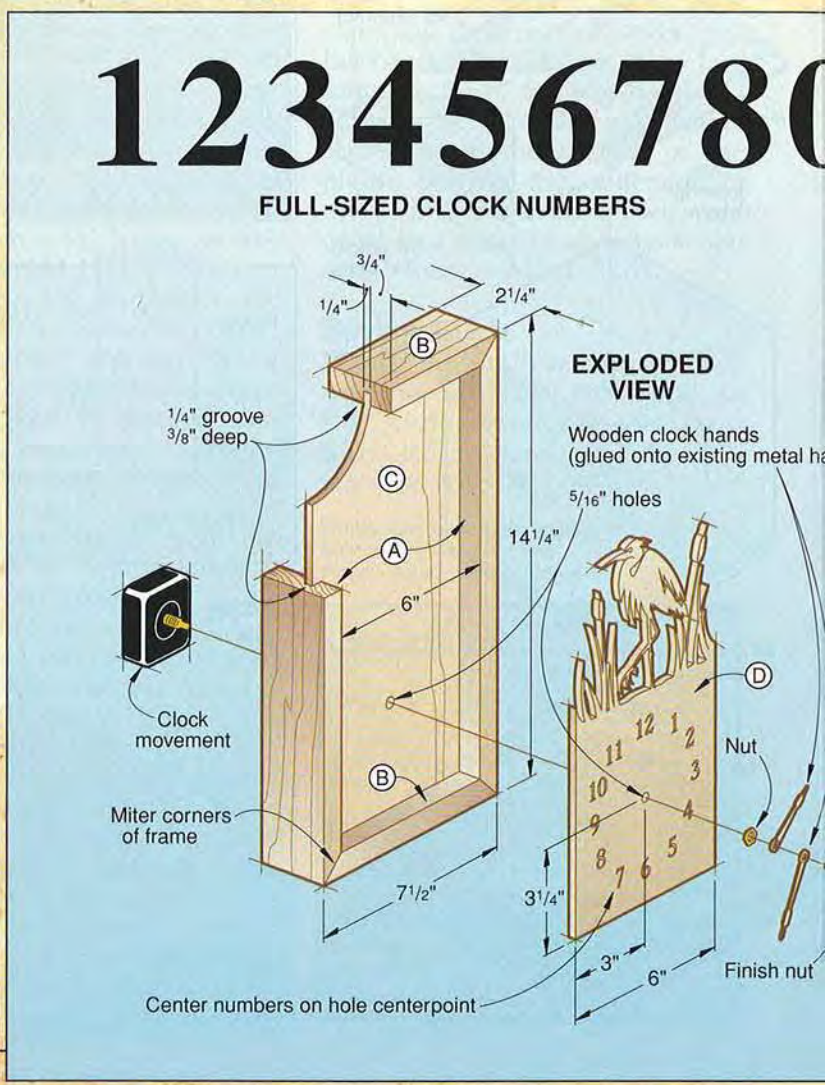
Miter-cut parts A and B to length, keeping the groove to the inside. Cut part C to finished size. Then assemble parts A and B around C, glue, and clamp.

Cut part D to size. Draw on it a vertical centerline and a line perpendicular to the centerline 3¼" from the bottom. Scribe a 5"-diameter circle (2½" radius) centered on the lines' intersection.

Now, lay out 12 equally spaced points around the circle for the hour markers. Here's one way to do it: Without changing your compass setting, step off a series of six arcs around the circumference of the circle, starting where the vertical line intersects the circle. Then, step off six more arcs starting from the horizontal line's intersection with the circle.

Photocopy the full-sized number patterns (you'll need five ones, two twos, and two sixes). Lay out the numbers inside the circle, keeping them vertical. Space the numbers visually, adjusting them for a pleasing appearance. Then, adhere them with rubber cement.

Photocopy the full-sized heron silhouette pattern. Fasten it to the



# SILHOUETTE

## A SCROLLSAWED FACE

stock, placing the top of the head at the top edge of the wood. Drill blade start holes, and scrollsaw the numbers. Saw the interior parts first on those numbers that have them. Then cut out the silhouette, beginning with the small inside cuts. (We used a no. 4 blade, .033×.014" with 15 teeth per inch for all cutting.)

Sand the assembled frame and front. Glue the cut-out face into place on the front. Spear the small center pieces for the 4, 6, 8, 9, and 0 on the tip of an X-acto knife to glue them into place. Cyanoacrylate (CA) adhesive works great for attaching those small inside pieces.

Snip the teardrop-shaped ends from the clock hands. Cut the cattail hands out of veneer that contrasts with the clock face, and attach to the metal hands with epoxy or CA glue.

Drill a 5/16" hole at the center of the clock circle. Sand the clock face as necessary, and apply a clear finish overall. When the glue has dried, insert the clock movement, secure with the nut provided, and install the hands.

### Buying Guide

**•Clock parts.** Movement with hands and battery, product no. 71220, $7.75 ppd. in U.S., Klockit, P.O. Box 636, Lake Geneva, WI 53147, or call 800/556-2548.

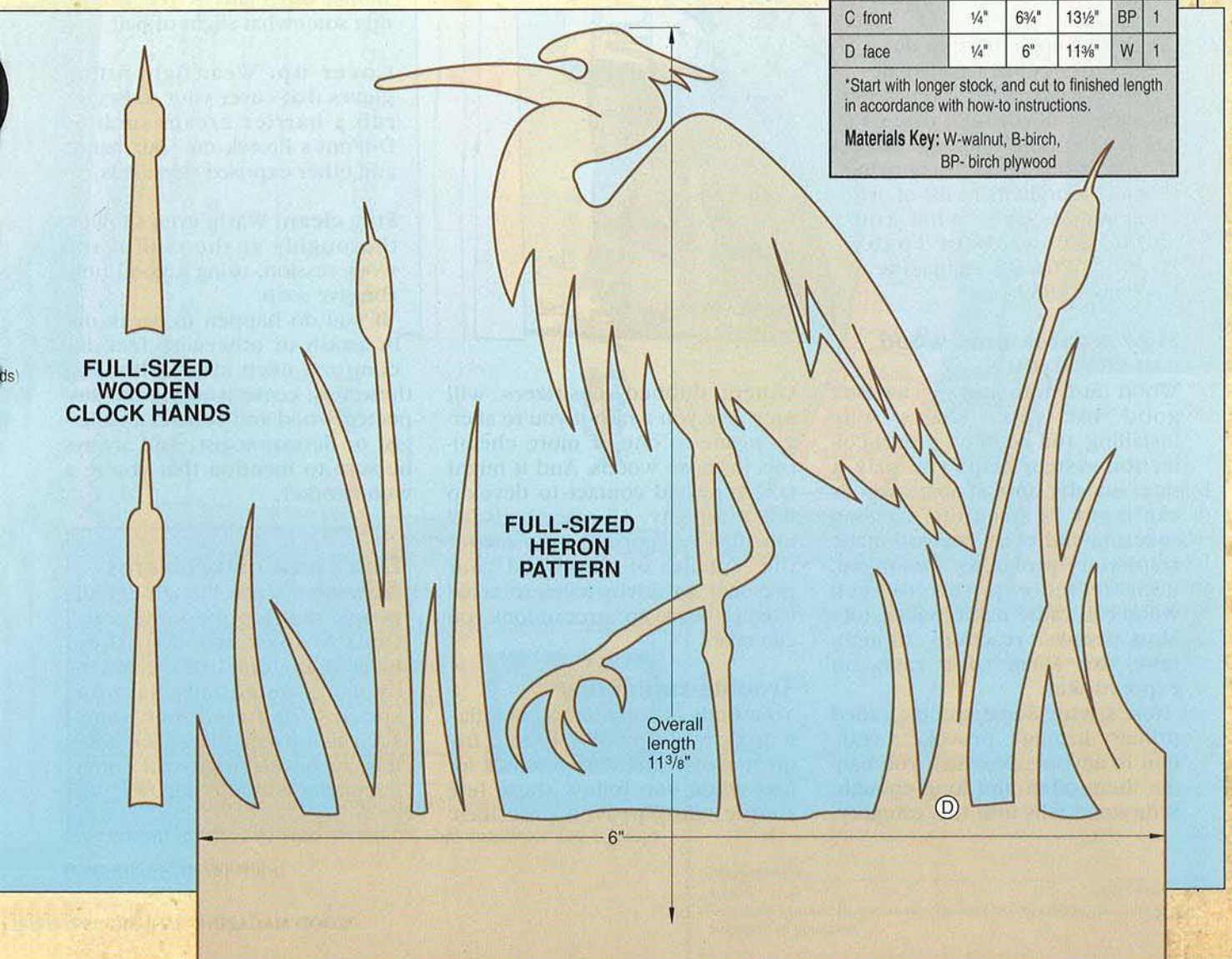
Project Design: © Bill Zaun
Photograph: John Hetherington
Illustrations: Kim Downing

**Bill of Materials**

| Part | Finished Size* | | | Matl. | Qty. |
|---|---|---|---|---|---|
| | T | W | L | | |
| A* sides | ¾" | 2¼" | 14¼" | B | 2 |
| B* ends | ¾" | 2¼" | 7½" | B | 2 |
| C front | ¼" | 6¾" | 13½" | BP | 1 |
| D face | ¼" | 6" | 11⅜" | W | 1 |

*Start with longer stock, and cut to finished length in accordance with how-to instructions.

**Materials Key:** W-walnut, B-birch, BP- birch plywood



# DON'T LET WOOD IRRITATE YOU

## A guide to handling toxic stock

Print this article

**Just like wild mushrooms, not every species of wood may agree with you. But unlike avoiding some forest fungi, you can still work potentially irritable wood. Here's how.**

In Canada years ago, several families in a community suffered stomach upset when they drank the water that ran off their new western red cedar roofs. But you don't actually have to ingest wood or its derivatives and extractives to feel the effects of a few species.

All some people have to do is touch cocobolo to break out in a crawly, rash. Even jewelry made of olivewood, rosewood, and certain other exotics, can set off a reaction from the wearing. (For a comprehensive list of irritable woods, see "What You Should Know About Toxic Wood," *WOOD*® magazine, December 1989.)

### How troublesome wood can affect you

Wood dust from any species isn't good for you. That's why installing and running a dust-collection system helps you play it safe. But the dust of some woods can really be irritating, causing sneezing and even near-asthmatic respiratory problems. Prolonged, unprotected exposure to such wood can cause nasal cancer, too. Most people's reactions, though, take the form of a rash on exposed skin.

Here's why: Some woods, called primary irritants, provoke a reaction in anyone, provided you handle them often and long enough. Satinwood falls into this category. Others, dubbed sensitizers, will only give you a rash if you're allergy prone to one or more chemicals in those woods. And it might take repeated contact to develop this sensitivity. All rosewoods fall into this category. But no matter the species of wood and your personal sensitivity level, to avoid trouble, there are precautions you can take.

### Trouble-saving tips

Your odds of reacting to potentially toxic wood tumble from a frequency of 1 in 100 to a whole lot less when you follow these few simple, shop-proven practices:

**Keep cool.** Provide sufficient ventilation to keep the temperature down and limit dust-collecting perspiration on your skin.

**Avoid dust.** Run your dust-collection system, or if you don't have one, wear a government-approved (NIOSH) dust mask that covers the eyes, too. And rub the rim with petroleum jelly for a tight seal.

**Dress tight.** Wear a long-sleeved shirt buttoned at the wrists and neck. Even a cap helps, especially if you're getting somewhat slight of hair.

**Cover up.** Wear tight-fitting gloves that cover your wrists, or rub a barrier cream such as DuPont's Protek on your hands and other exposed skin areas.

**Stay clean.** Wash, even shower, thoroughly at the end of the work session, using a good non-abrasive soap.

If you do happen to break out in a rash or otherwise feel discomfort, even after following these tips, cease working the suspected wood and contact an allergist or dermatologist. And always be sure to mention that you're a woodworker.

### Don't pass off problems

Remember, even though not all people develop the same reactions to toxic wood (if they react at all), don't take chances by using potentially harmful species for functional items such as bowls, plates, or goblets, or jewelry that will come in contact with the skin.

Illustration: Jim Stevenson

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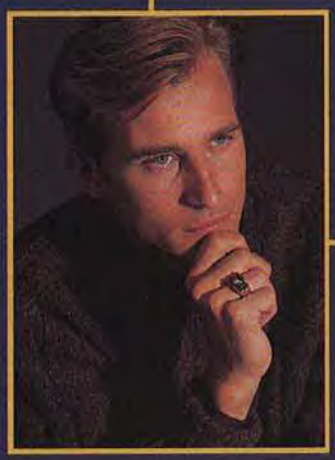

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I tried six different versions of this tool, each shown in the photo *left*, and identified by its product number. I found models 875 and 876 round and square planing rasps to be the most useful products in this lineup. Both have a wooden handle and work with greater ease and efficiency than a traditional rasp.

Three other planing rasps—models 870, 872, and 874—fit into a standard 12" hacksaw frame. These proved to be effective cutting tools, but were more awkward to handle. I do not recommend the Fast-Cut Hacksaw Blade (model 865). It, too, mounts in a hacksaw, but I had little luck making accurate cuts with one.

***—Tested by Chuck Hedlund***

*General Tools Ultra Shapers, $7.98-$11.46 list each. Available through many woodworking catalogs and distributors nationwide including Ace Hardware Stores. For more information contact General Tools Manufacturing Co. at 212/431-6100.*

*Continued on page 72*

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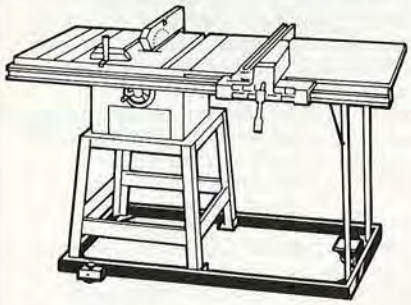

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*Continued from page 71*

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You can get the same polished edge with a felt buffing wheel on your bench grinder, but the felt wheels cost double or triple the price of this kit. I found the Surgi-Sharp practical, affordable, and easy to use.

***—Tested by Chuck Hedlund***

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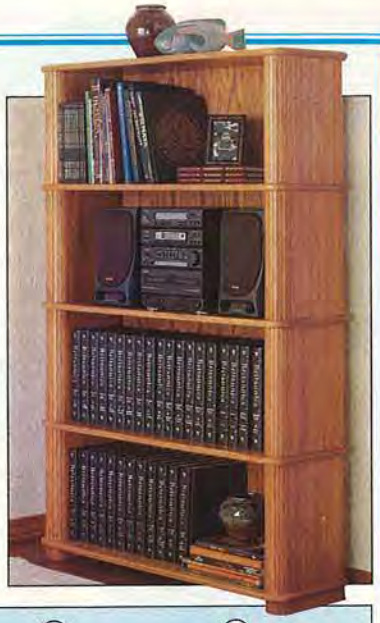
# TAMBOUR BOOKCASE

*Continued from page 48*



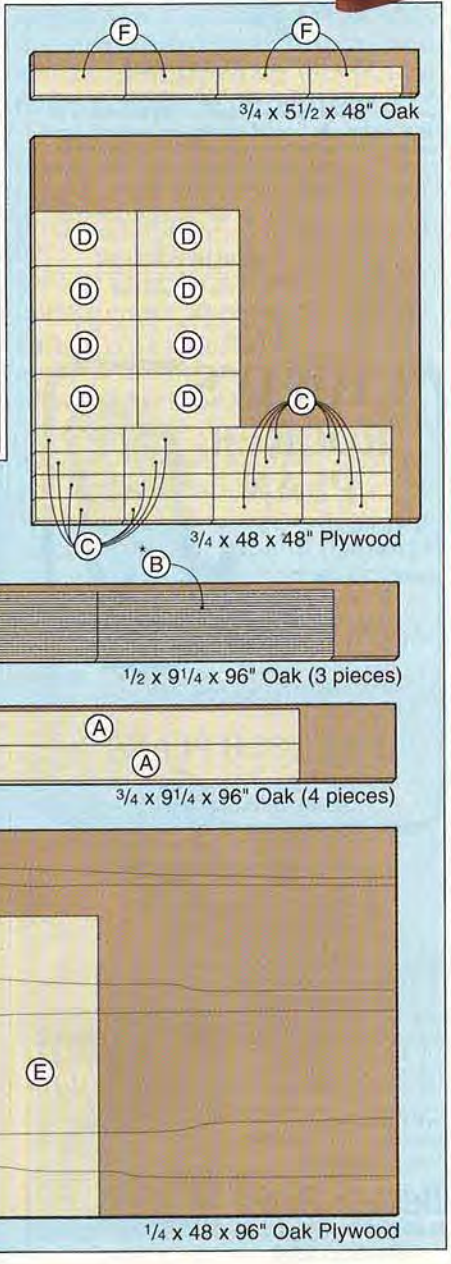
## BILL OF MATERIALS AND CUTTING DIAGRAM
**(for 4-high tambour bookcase)**

**Bill of Materials**

| Part | Finished Size T | W | L | Matl. | Qty. |
|---|---|---|---|---|---|
| FOUR-HIGH UNIT | | | | | |
| A* shelves | ¾" | 12½" | 42" | EO | 5 |
| B* tambour strips | 3/16" | 7/16" | 14" | O | 448 |
| C support caps | ¾" | 2⅞" | 11⅛" | PL | 16 |
| D uprights | ¾" | 6¾" | 12½" | PL | 8 |
| E backs | ¼" | 37½" | 14½" | OP | 4 |
| F feet | 1½" | 3¼" | 11½" | LO | 2 |

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

**Materials Key:** EO–edge-joined oak, O–oak PL–plywood, OP–oak plywood, LO–laminated oak.


F
F
3/4 x 5 1/2 x 48" Oak
D
C
3/4 x 48 x 48" Plywood
*Plane or resaw to 7/16" thick, and then rip to 3/16" wide
B
1/2 x 9 1/4 x 96" Oak (3 pieces)
A
3/4 x 9 1/4 x 96" Oak (4 pieces)
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| 332 | QUIKSAND 5" RNDM ORB W/STIKIT PAD | 63 |
| 332K | 332 W/CASE & 100 SHEETS PAPER | 89 |
| 333 | QUIKSAND W/HOOK & LOOP, DUSTLS | 73 |
| 333K | 333 W/CASE & 50 SHEETS PAPER | 99 |
| 334 | QUIKSAND W/STIKIT, DUSTLESS | 73 |
| 334K | 334 W/CASE & 100 SHEETS PAPER | 99 |
| 345 | SAW BOSS 6" CIRCULAR SAW | 104 |
| 347 | 7 1/4" FRAMERS SAW 15 AMP, 10.25 LBS | 128 |
| 351 | 3" X 21" BELT SANDER | 142 |
| 352 | 3" X 21" BELT SANDER W/DUST BAG | 147 |
| 352VS | 3" X 21" VS BELT SANDR W/DUST BAG | 158 |
| 360 | 3" X 24" BELT SANDER W/DUST BAG | 182 |
| 361 | 3" X 24" BELT SANDER | 174 |
| 362 | 4" X 24" BELT SANDER W/DUST BAG | 188 |
| 363 | 4" X 24" BELT SANDER | 184 |
| 410 | UNDERSCRIBE LAMINATE TRIMMER | 150 |
| 411 | MITER FOLD LAMINATE TRIMMER | 165 |
| 447 | 7 1/4" FRAMERS SAW W/BRAKE 15 AMP | 138 |
| 505 | 1/2 SHT FIN SANDER | 118 |
| 550 | *NEW POCKET CUTTER* | 178 |
| 556 | BISC JOINER W/CASE & TILT FENCE | 177 |
| 556K | SAME AS ABOVE W/1000 BISCUITS | 199 |
| 690 | 1 1/2 HP ROUTER W/1/4" & 1/2" COLLETS | 139 |
| 690K | 690 W/CS, EDGE GUIDE, & TEMP GD KIT | 169 |
| 9690 | 1 1/2 HP ROUTER W/CASE | 139 |
| 691 | 1 1/2 HP "D" HANDLE ROUTER | 143 |
| 693 | PLUNGE BASE ROUTER, 1 1/2 HP | 164 |
| 695 | SHAPER TABLE W/ 1 1/2 HP ROUTER | 213 |
| 696 | SHAPER TABLE | 123 |
| 2620 | 3/8" VSR DRILL, 0-1200 RPM W/CHK | 99 |
| 5008 | DOVETAIL TEMPLATE | 76 |
| 5009 | MORTISE & TENON JIG | 44 |
| 5116 | OMNI JIG | 258 |
| 6931 | PLUNGE ROUTER BASE | 74 |
| 7116 | *NEW 24" OMNIJIG* | 289 |
| 7310 | LAMINATE TRIMMER, 5.6 AMP | 88 |
| 7312 | OFFSET TRIMMER | 122 |
| 7319 | TILT BASE TRIMMER | 99 |
| 7335 | 5" RANDOM ORBIT SANDER, VS | 128 |
| 7335K | 7335 W/CS, DUST EX SYS, 100 SHTS PPR | 172 |
| 7336 | 6" RANDOM ORBIT SANDER, VS | 132 |
| 7336K | 7336 W/CS, DUST EX SYS, 100 SHTS PPR | 179 |
| 73333 | RANDOM ORBIT DUST EXTRACTION | 24 |
| 7518 | 3 1/4 HP FIXED BASE ROUTER-5 SPEED | 262 |
| 7519 | 3 1/4 HP FIXED BASE ROUTER-1 SP | 228 |
| 7536 | 2 1/2 HP FIXED BASE ROUTER | 197 |
| 7537 | 2 1/2 HP FIXED BASE "D" HNDL RTR | 207 |
| 7538 | 3 1/4 HP PLUNGE ROUTER-1 SPEED | 228 |
| 7539 | 3 1/4 HP PLUNGE ROUTER-5 SPEED | 262 |
| 7549 | TOP HANDLE BAYONET SAW | 143 |
| 7649 | BARREL GRIP BAYONET SAW | 143 |
| 7700 | *NEW 10" LASERLOC MITER SAW* | 338 |
| 9118 | PORTA PLANE KIT W/CASE, CRBD BLD | 203 |
| 9314 | 4 1/2" TRIM SAW KIT | 148 |
| 9315 | 7 1/4" BUILDERS SAW KIT | 138 |
| 9345 | SAW BOSS 6" CIRCULAR SAW KIT | 122 |
| 9637 | TIGER SAW VAR SPD RECIP SAW KIT | 138 |
| 9647 | TIGER CUB RECIP SAW KIT | 115 |
| 9840 | CRDLS DRILL KIT W/2 BAT, CS KYLS CK | 158 |
| 9853S | SAME AS ABOVE BUT W/2 BATTERIES! | 177 |
| 97310 | LAMNT TRIMMR KIT W/4 BASES & CS | 189 |
| 97751 | 1/2" VS, 2 SPD HAMMER DRILL KIT | 145 |

## Panasonic

| | | |
|---|---|---|
| EY6181CRKW | *NEW PREDATOR* 9.6V CORDLESS KIT VSR W/KYLS CHUCK, 22 STAGE CLUTCH W/2 BAT, CASE & CHRGR | 162 |
| EY6100CRKW | *NEW PREDATOR* 12V CORDLESS KIT VSR W/KYLS CHUCK, 22 STAGE CLUTCH W/2 BAT, CASE, & CHARGER | 192 |

## RYOBI

| | | |
|---|---|---|
| BT3000S | 10" TABLE SAW WITH STAND | 529 |
| AP12 | 12" PORTABLE PLANER | 396 |
| TSS220 | 8 1/2" SLIDE COMPOUND MITR SAW | 438 |
| TS-380 | 15" MITER SAW | 369 |
| OSS450 | OSCILLATING SPINDLE SANDR | 174 |
| D38VSR | 3/8" VSR DRILL, 4.0 AMP, 0-2500 RPM | 59 |

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## DELTA

| | | |
|---|---|---|
| 22-540 | 12" BENCH TOP PLANER | 398 |
| 28-180 | BENCH TOP BAND SAW | 167 |
| 31-080 | 1" BELT/5" DISC SANDER | 83 |
| 31-460 | 4" BELT/6" DISC SANDER | 129 |
| 33-060 | NEW SIDEKICK 6 1/2" FRAME & TRIM SAW | 369 |
| 37-070 | *NEW* 6" VS BENCH JOINTER | 249 |
| 40-560 | 16" SCROLL SAW, 2 SPEED | 179 |
| 50-075 | DUST COLLECTOR/SWEEPER, 3/4 HP | 245 |
| 50-175 | *NEW* KICKSTAND PRTBL WORK STAND | 169 |

## Milwaukee

| | | |
|---|---|---|
| 0405-1 | 9.6V KYLS CDLS DRILL KIT W/2BAT, CS | 169 |
| 0407-1 | SAME AS ABOVE BUT 12 VOLT | 174 |
| 6010 | 1/2 SHEET FINISHING SANDER | 119 |
| 6017 | 1/4 SHEET FINISHING SANDER W/BAG | 55 |
| 6125 | 5" RANDOM ORBIT SANDER | 112 |
| 6126 | 6" RANDOM ORBIT SANDER | 115 |
| 6256 | TOP HANDLE JIG SAW | 145 |
| 6365 | 7 1/4" CIRCULAR SAW, 13 AMP | 120 |
| 6490 | *NEW* 10" MITER SAW INC 80T CARB BLD | 249 |
| 6507 | VAR SPEED SAWZALL W/BLADES & CSE | 143 |
| 6508 | SAME AS 6507 BUT W/PERMANENT CRD | 143 |
| 6527 | SUPER SAWZALL W/BLADES & CASE | 169 |
| 6528 | SAME AS 6527 BUT W/PERMANENT CRD | 169 |

## AEG

| | | |
|---|---|---|
| TXE150 | 6" VS DUST FREE RANDOM ORBIT SANDER W/VELCRO PAD | $144 |

## DeWALT

| | | |
|---|---|---|
| DW100 | 3/8" DRILL, 0-2500 RPM, 4 AMP | 68 |
| DW318K | 4.5 AMP HVY DTY JIG SAW KIT W/CS | 144 |
| DW360 | 7 1/4" SAW W/BRAKE | 139 |
| DW430 | 3" X 21" DUSTLESS BELT SANDER | 164 |
| DW431 | 3" X 21" DSTLS BELT SANDER VAR SP | 182 |
| DW610 | 1 1/2 HP ROUTER, 9 AMP | 147 |
| DW614 | 1 1/4 HP PLUNGE ROUTER | 143 |
| DW615 | 1 1/4 HP PLUNGE ROUTER, VAR SP | 158 |
| DW624 | 3 HP HVY DUTY PLUNGE ROUTER | 245 |
| DW625 | 3 HP HVY DTY PLUNGE RTR, VAR SP | 275 |
| DW682K | BISCUIT JOINER KIT W/100 BISCUITS | 224 |
| DW705 | 12" COMPOUND MITER SAW | 358 |
| DW944K2 | 9.6V CORDLESS KIT W/2 BATTERIES | 148 |
| DW945K2 | 12V CORDLESS KIT W/2 BATTERIES | 168 |

## HITACHI

| | | |
|---|---|---|
| D10DFKBE | 9.6V, CRDLS DRILL KIT W/2BAT & CS-KYLS | 148 |
| D9612DVAKBE | 12V CORDLESS DRILL KIT W/2 BAT | 189 |
| D10VC | 3/8" DRILL VAR SP, REV, 3.2 AMPS | 59 |
| SV12SA | 4 3/8" PALM GRIP SANDER | 49 |
| SB75 | 3"x21", 2 SPEED BELT SANDER | 136 |
| SB10T | 4"x24", 2 SPEED BELT SANDER | 160 |
| CJ65V2 | TOP HANDLE JIG SAW W/CASE | 155 |
| P20SB | 3 1/4" PLANER, 3.4 AMP | 89 |
| TR6 | LAMINATE TRIMMER | 92 |
| M8V | VAR SPEED PLUNGE ROUTER, 1/4" | 149 |
| TR12 | 3 HP PLUNGE ROUTER | 184 |
| M12V | 3 HP VAR SPEED PLUNGE ROUTER | 224 |

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|---|---|---|
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| 1021VSR | 3/8" 1100 RPM DRILL | 99 |
| 1194VSR | 1/2" VSR, 2 STAGE HAMMER DRILL | 140 |
| 1272 | 3" X 24" BELT SANDER | 175 |
| 1272D | 3" X 24" DUSTLESS BELT SANDER | 183 |
| 1273 | 4" X 24" VS BELT SANDER | 182 |
| 1273D | 4" X 24" DUSTLESS BELT SANDER | 195 |
| 1273DVS | 4" X 24" VS DUSTLSS BELT SANDER | 199 |
| 1370DEVSK | 6" VS DSTLS RNDM ORB SNDR KIT | 259 |
| 1581VS | TOP HANDLE JIG SAW, VS | 144 |
| 1581DVS | SAME AS ABOVE BUT DUSTLESS | 167 |
| 1582VSC | CLIC BARREL HANDLE JIG SAW, VS | 144 |
| 1582DVS | SAME AS ABOVE BUT DUSTLESS | 167 |
| 1604 | 1 3/4 HP ROUTER | 134 |
| 1608 | LAMINATE TRIMMER | 84 |
| 1608U | UNDERSCRIBE TRIMMER | 117 |
| 1609K | INSTALLERS KIT WITH 3 BASES | 173 |
| 1609KX | DELUXE INSTALLERS KIT W/4 BASES | 197 |
| 1613 | 1 3/4 HP PLUNGE ROUTER | 163 |
| 1613EVS | 2 HP VAR SP PLUNGE ROUTER | 183 |
| 1614 | 1 HP PLUNGE ROUTER | 127 |
| 1614EVS | 1 1/4 HP VAR SP PLUNGE ROUTER | 148 |
| 1615EVS | 3 1/4 HP VAR SP PLUNGE ROUTER | 243 |
| 1655 | 7 1/4" CIRCULAR SAW | 109 |
| 3050VSRK | 9.6 V, VSR CRDLS DRILL W/2 BAT, CS | 134 |
| 3282DVS | 5" VS DUSTLESS RANDOM ORBIT | 98 |

## SKIL

| | | |
|---|---|---|
| 77 | 7 1/4" WORM DRIVE CIRCULAR SAW | 145 |
| 1605-02 | BISC JOINR W/CS, 100 CLAMPLESS BISCUITS, & GLUE SYS | 125 |
| 1875 | 2 1/4 HP EVS PLUNGE RTR W/BIT SET | 174 |
| 2736-04 | 12V CRDLS KIT W/FREE 15 PC BIT SET | 136 |
| 3330 | 16" SCROLL SAW | 135 |
| 3370 | 4" BELT/6" DISC SANDER | 135 |
| 3380 | 8" DRILL PRESS | 135 |
| 3400 | 10" TBL SAW W/FREE 10"X32T CARB BLD | 179 |
| 3810 | 10" MITER SAW W/FREE CARBD BLADE | 204 |
| 5657 | 7 1/4" CIRC SAW W/6 FREE CARB BLDS | 112 |
| 5860 | 8 1/4" WORM DRIVE SAW | 172 |
| 9410 | 4 1/2" DISC GRINDER | 59 |

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| JS100K | JS100 W/1000 BISCS AFTER REBATE | 157 |
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| LU87M010 | 10" X 24T RIP BLADE THIN KERF | 39 |
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| LU91M008 | 8 1/2" X 48T FOR COMPOUND MITER | 41 |
| LU92M010 | 10" X 80T TCH - BEST FOR LAMINATES | 58 |
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| TK806 | 10" X 80T ATB ULTIMATE CROSSCT BLD | 44 |
| TK906 | 10" X 50T THIN KERF CROSSCUT | 30 |
| TK406 | 10" X 60T THIN KERF FINISHING | 34 |
| WC104 | 4 PC WOOD CHISEL SET W/CASE | 46 |
| WC106 | 6 PC WOOD CHISEL SET W/CASE | 56 |
| WC110 | 10 PC WOOD CHISEL SET W/CASE | 86 |
| FC107 | 7 PC CARBIDE FORSTNER BIT SET | 64 |
| SD306 | 6" SAFETY DADO WITH CASE | 116 |
| 88-100 | 9 PC BASIC ROUTER BIT SET | 104 |
| 94-100 | CABINET DOOR SET, 1/2" SHANK | 158 |

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# ASK WOOD

Print this article

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## Shelf life of glue

What's the shelf life of wood glue, and can it be preserved by freezing?

*—Hank Riccio, Stratford, Conn.*

*For an answer, Hank, we contacted the glue experts at Franklin International. They told us the recommended shelf life of their yellow woodworker's glue varies from 6 to 12 months after opening. They recommend against freezing any water-based glue product for storage.*

## What's the real horsepower?

I have a Craftsman tablesaw with its motor rated 4 horsepower at 3450 rpm and 16.8 amps. I also bought a Grizzly tablesaw with its motor rated 1½ hp at 3450 rpm and 17.2 amps. How do different manufacturers manage to rate their electric motors so differently?

*—Mike Kunz, Ocean Park, Wash.*

*Mike, manufacturers typically rate a tool's power in terms of continuous horsepower or maximum-developed horsepower. The same motor will have completely different continuous or maximum-developed horsepower ratings, with the maximum developed horsepower always being the higher number. (Maximum developed horsepower ratings can be two to three times a tool's continuous-duty horsepower.) For a more realistic comparison of power, compare two motors by looking at their amperage draw.*

*Some manufacturers of power tools sold predominantly to consumers use the maximum-developed horsepower ratings on their motors. Tools aimed at the professional woodworker will have the more conservative continuous horsepower ratings.*

*Continued on page 78*


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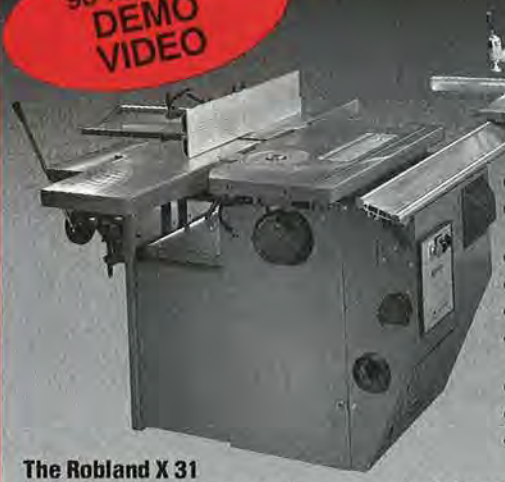

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| 30T 1/8 & 3/32 | 135 | 99 |
| 9" x 40T | $146 | $109 |
| 30T | 125 | 99 |
| *8-1/4" x 40T 3/32 | 136 | 99 |
| 8" x 40T 3/32 | 136 | 99 |
| 30T 3/32 | 115 | 89 |
| 7-1/4" x 30T 3/32 | 112 | 69 |
| New 6" x 40T 3/32 | 139 | 89 |

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- Totally stops ALL bottom and top splinter on ply veneers in push-cut mode on RADIAL.
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| | List | SALE |
|---|---|---|
| 14" x 60T x 1" 1/8" | $224 | $159 |
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| 10" x 60T x 5/8" 3/32" K | 162 | 129 |
| 9" x 60T x 5/8" 3/32" K | 156 | 119 |
| 8" x 60T x 5/8" 3/32" K | 150 | 109 |
| New 8-1/4" x 60T x 5/8" 3/32" K | 150 | 109 |

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**"No tearout on all five woods tested."** *-Fine Woodworking July/Aug, 1991*

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## DURALINE Hi-AT For TABLE & RADIAL SAW

(very good on chop saw too!) STOP SPLINTERING those SPLINTERY OAKS, HARDWOOD VENEERS and *thin* 2 SIDE LAMINATES ON PARTICLE BOARD. FOR FASTER FEED RATES AND MORE ABSOLUTE SPLINTER CONTROL.

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### DURALINE Hi-AT

***Note:*** *Fine Woodworking Editorial Nov./Dec. 1988 No. 73, pg. 65, S.N. recommends high alternating top bevel (ATB) thin kerfs and large blade stiffeners for smoothest cuts on RADIAL SAW, etc.*

Jim Forrest, President and designer microscoping cutting edge.

All 5/8" holes. Boring up to 1-1/4" $7.50 extra
Larger holes - time basis. Shipping $4.50

| | | | |
|---|---|---|---|
| 7-1/4" x 60T 3/32" K | $129 | 12" x 80T x 1" 1/8 | $181 |
| 8" x 80T 1/8" & 3/32" K | 169 | 12" x 100T x 1" 1/8 | 215 |
| 9" x 80T 1/8" & 3/32" K | 179 | 14" x 80T x 1" | 197 |
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| Ryobi-Makita & all | 10" x 80T x 5/8" | 207 | 129 |
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Circle #1322 in Worth Writing For

# ASK WOOD

*Continued from page 76*

## More twists on bending wood

I would like to know if there are any other ways of bending wood besides steaming?

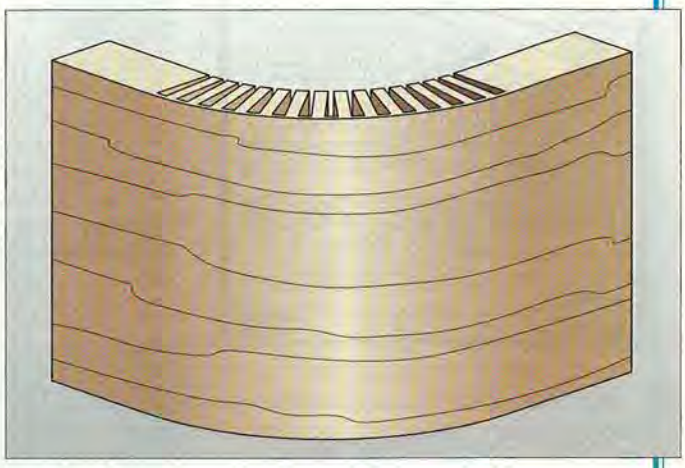
***—Edwin Yusko, Tucson, Ariz.***

*There are several other methods to bend wood, Ed. Which method you use depends on the type and thickness of the wood, the radius of the bend, and the stresses placed on the finished piece.*

*The strongest of the non-steam methods is the cold-molding or laminated-veneer method. To do this you laminate several layers of 1/16- to 1/8"-thick wood around a form (see our Bentwood Toboggan project in the October 1991 issue). The finished piece will retain the shape of the mold when the glue dries.*

*Musical instrument makers bend sides and linings of their instruments using dry heat. Here, you bend thin wood (1/16 to 1/8" thick) over an electric bending iron or a heated pipe to set the shape of the sides. Instrument makers often assemble their creations on a mold to ensure the best alignment of the sides with the instrument's top and back.*

*Old-time chair makers bend green wood on a simple form to make the slats for ladder-back chairs.*



*These pieces will retain some of the bend after the wood dries.*

*You can use kerf-bending on plywood or solid wood where one side will not be seen. First, you make a series of cuts partially through the wood, on the inside of the bend. Generally, we recommend leaving at least 1/8" of wood at the bottom of the kerf. Dampen the outside grain of the wood just before bending to help reduce splintering.*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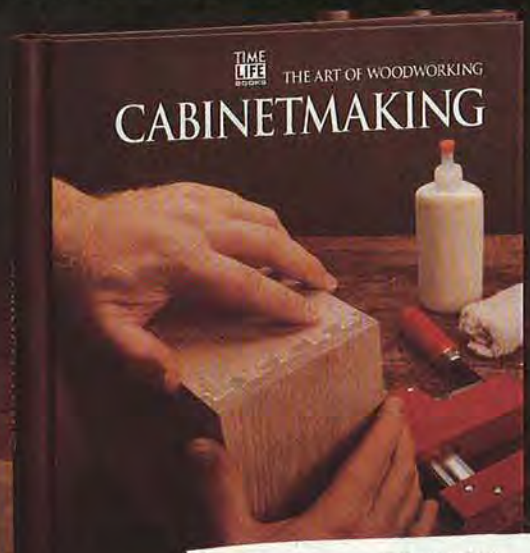


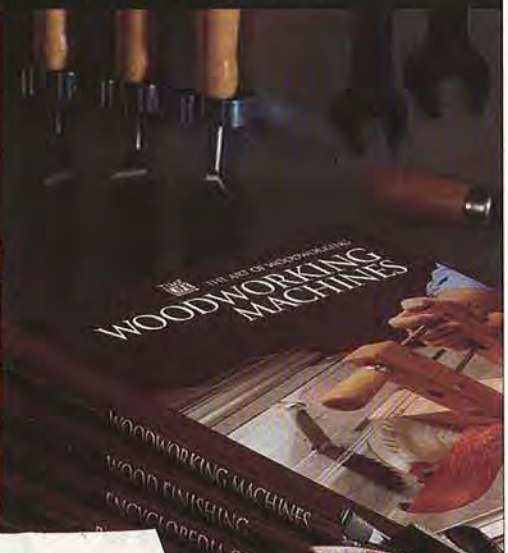


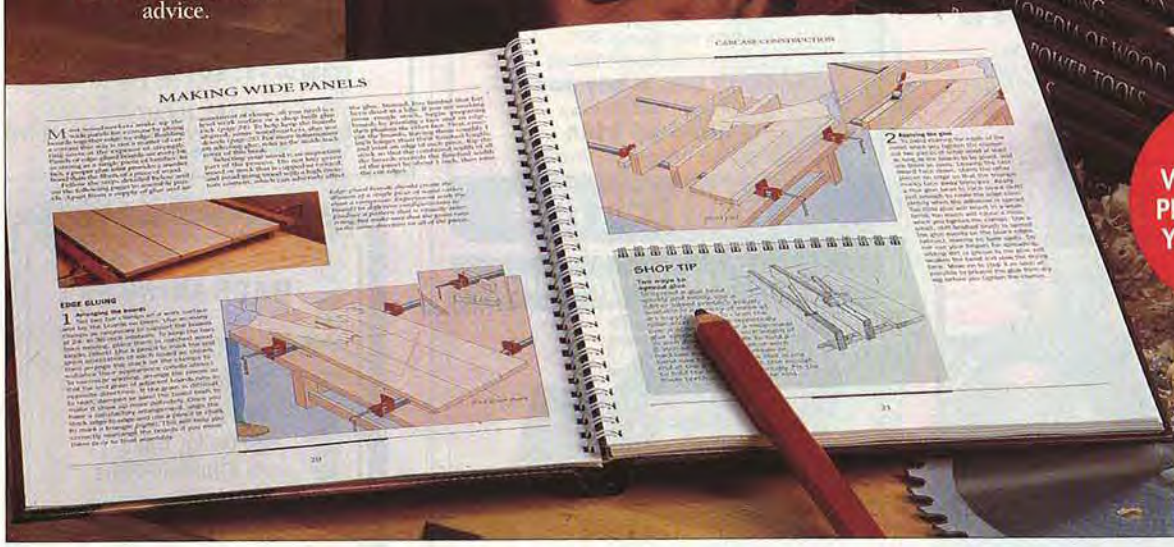


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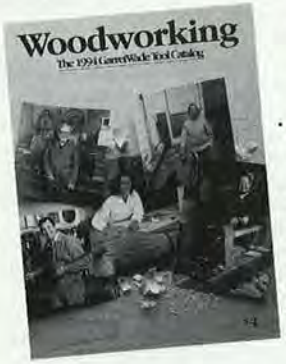


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## DELTA TOOLS

| Model | Description | List | Sale |
|---|---|---|---|
| 23-700 | Wet/Dry Grinder | 234 | 168 |
| 23-680 | 6" Bench Grinder 1/4 HP | 86 | 75 |
| 23-880 | 8" Bench Grinder 1/2 HP | 151 | 115 |
| 11-950 | 8" Drill Press | 199 | 144 |
| 31-050 | 1" Belt sander 2.0 amp | 104 | 78 |
| 31-460 | 4" Belt/Disc Sander | 196 | 135 |
| 31-340 | 1" Belt/8" Disc Sander | 288 | 199 |
| 31-080 | 1" Belt/5" Disc Sander | 134 | 94 |
| 40-560 | 16" 2 speed Scroll Saw | 266 | 178 |
| 11-990 | 12" Bench Drill Press | 276 | 205 |
| 11-090 | 32" Radial Bench Drill Press | 399 | 278 |
| 43-355 | 3/4" Shaper 1-1/2 HP | 964 | 709 |
| 43-505 | 1/2" Bench Router/Shaper | 399 | 275 |
| 22-540 | **12" Bench Top Planer** | | 389 |
| 36-220 | 10" Compound Mitre Saw | 350 | 228 |
| 28-180 | Bench Band Saw | 232 | 165 |
| 28-190 | NEW 12" Band Saw | 465 | 375 |
| 40-640 | 20" Bench Scroll Saw | 466 | 305 |
| 37-070 | NEW 6" w/spd Bench Jointer | 330 | 248 |
| 14-650 | Hollow Chisel Mortiser | 361 | 289 |
| 46-700 | 12" Wood Lathe | 548 | 435 |
| 34-761 | 10" Unisaw 1-1/2 HP | 1715 | 1359 |
| 33-990 | 10" Radial Arm Saw | 818 | 615 |
| 37-280 | 6" Motorized Jointer | 488 | 395 |
| 37-154 | DJ15 6"Jointer w/3/4HPmotor | 1420 | 1089 |
| 50-179 | 3/4 HP 2 stage Dust Collector | 483 | 335 |
| 70-200 | 20" Floor Drill Press | 1049 | 810 |
| 33-055 | 8-1/4" Sawbuck comp w/legs | 865 | 595 |
| 34-330 | 8-1/4" Table Saw 13A | 343 | 234 |
| 32-100 | Station Plate Jointer | 645 | 265 |
| 36-040 | 8-1/4" Compound Mitre Saw | 224 | 159 |
| 34-915 | 30" Unifence | 385 | 239 |
| 34-897 | 50" Delta Unifence | 525 | 285 |
| 36-755 | 10" Tilt Arbor Saw | 1264 | 935 |
| 34-444 | Contractors Table Saw | 812 | 615 |
| 17-900 | 16-1/2" Floor Drill Press | 441 | 389 |
| 40-601 | 18" Scroll Saw with stand | 942 | 745 |
| 22-661 | 13" Planer with 2HP motor | 1436 | 1175 |

Planer has **$75.00 rebate**-price is before rebate

| | | | |
|---|---|---|---|
| 33-060 | NEW "Sidekick" Miter Saw | 499 | 365 |
| 14-070 | NEW 14" Floor Drill Press | 450 | 345 |
| 50-075 | Dust Collector/Sweeper 3/4 HP | 360 | 245 |

**The following Delta tools have a $50.00 rebate! Price shown is before rebate.**

| | | | |
|---|---|---|---|
| 28-283 | 14" Band Saw w/enc. stand | 910 | 735 |
| 34-445 | 34-444 Saw w/30" Unifence | 1200 | 775 |
| 34-445B | 34-444 w/Bies. 50" saw fence | 1300 | 889 |

## MILWAUKEE TOOLS

| | | | |
|---|---|---|---|
| 6527 | NEW Sawzall with case | 309 | 164 |
| 6528 | above Sawzall w/wired cord | 305 | 164 |
| 6125 | NEW 5"Random Orbit Sander | 200 | 119 |
| 6126 | NEW 6"Random Orbit Sander | 205 | 125 |
| 0399-1 | 12V cordless Drill Kit comp | 309 | 165 |
| 0402-1 | **above Drill w/kyls chuck & 2 batt** | | 168 |
| 0395-1 | 9.6V cordless Drill with case | 284 | 158 |
| 0224-1 | 3/8" Drill 4.5 amp magnum | 215 | 114 |
| 0234-1 | 1/2" Drill 4.5A mag 0-850 rpm | 229 | 119 |
| 0244-1 | 1/2" Drill 4.5A mag 0-600 rpm | 229 | 123 |
| 0222-1 | 3/8" Drill 3.5 amp 0-1000 rpm | 189 | 107 |
| 0228-1 | 3/8" Drill 3.5 amp 0-1000 rpm | 186 | 104 |
| 0375-1 | 3/8" close quarter Drill | 229 | 127 |
| 0379-1 | 1/2" close quarter Drill | 260 | 145 |
| 6546-1 | cdls Screwdvr 200 & 400 rpm | 138 | 79 |
| 5399 | 1/2" D-hdle Hammer Drill Kit | 325 | 188 |
| 6750-1 | Drywall Gun 0-4000 5 amp | 168 | 94 |
| 6507 | Original SawZall with case | 259 | 138 |
| 6010 | Orbital Sander 1/2 sheet | 214 | 118 |
| 8977 | variable temp. Heat Gun | 128 | 77 |
| 5397-1 | 3.8" var. spd Hammer Drill Kit | 250 | 138 |
| 5371-1 | 1/2" var. spd Hammer Drill Kit | 375 | 184 |
| 3107-1 | 1/2" v/spd right angle Drill Kit | 385 | 204 |
| 6754-1 | Drywall Gun 0-4000 5.4 amp | 192 | 108 |
| 3300-1 | 1/2" var. spd right angle Drill | 339 | 182 |
| 5680 | Router 2 HP - 12 amp | 355 | 198 |
| 0235-1 | 1/2" Drill w/keyless chuck | 229 | 128 |
| 6145 | 4-1/2" Grinder 10,000 rpm | 165 | 99 |
| 6142 | 6145 with case & accessories | 204 | 124 |
| 6749-1 | Drywall Gun 0-2500 5.4 amp | 214 | 124 |
| 6365 | 7-1/4" Circular Saw 13 amp | 214 | 122 |
| 6366 | 6365 w/fence & carbide blade | 224 | 127 |
| 6368 | 6365 w/fnce,carb. blde,& cse | 244 | 139 |
| 6377 | 7-1/4" Worm Drive Saw | 324 | 179 |
| 6256 | Top Handle Jig Saw | 259 | 144 |
| 6490 | 10" Mitre Saw | 444 | 248 |

## FREUD CARBIDE TIPPED SAW BLADES 5/8" Bore - Industrial Grade

| Item | Description | Teeth | List | Sale |
|---|---|---|---|---|
| LU72M010 | Gen Pur A.T.B. | 10° 40 | 69 | 36 |
| LU82M010 | Cut-off | 10° 60 | 93 | 49 |
| LU84M011 | Comb | 10° 50 | 78 | 42 |
| LU85M010 | Super Cut-off | 10° 80 | 115 | 59 |
| LM72M010 | Ripping | 10° 24 | 69 | 38 |
| LU73M010 | Cut off | 10° 60 | 84 | 45 |
| LU87M010 | Thin Kerf | 10° 24 | 72 | 39 |
| LU88M010 | Thin Kerf | 10° 60 | 88 | 45 |
| LU98M010 | Ultimate | 10° 80 | 128 | 68 |
| LU91M010 | Compnd Mitre | 10° 60 | 88 | 54 |
| TK303 | 7-1/4" Finishing | 40 | 38 | 22 |
| TK306 | 10" Finishing | 40 | 47 | 25 |
| TK906 | 10" Combo | 50 | 53 | 29 |
| SD306 | 6" Dado - Carbide | | 215 | 112 |
| SD308 | 8" Dado - Carbide | | 230 | 119 |
| F0 | 1-3/4" x 5/8" Biscuit 1000 Qty | | 43 | 29 |
| F10 | 2-1/8" x 3/4" Biscuit 1000 Qty | | 43 | 29 |
| F20 | 2-3/4" x 1" Biscuit 1000 Qty | | 45 | 29 |
| FA | Assorted Biscuits 1000 Qty | | 45 | 29 |
| FB100 | 16 piece Forstner Bit Set | | 338 | 184 |
| 94-100 | 5 pc. Router Bit Door System | | 320 | 163 |

The following FREUD Tools have a $30.00 rebate!
Price shown is before rebate - Expires 1/15/94

| | | | |
|---|---|---|---|
| FT2000E | 3-1/4 HP v/spd Plunge Router | 410 | 205 |
| JS100 | Biscuit Jointer with case | 334 | 162 |

## MAKITA TOOLS

| Model | Description | List | Sale |
|---|---|---|---|
| 6070DW | 3/8" v/spd Reverse Drill 7.2V | 128 | 74 |
| 6071DWK | above Drill w/removable batt. | 216 | 110 |
| 5090DW | 3-3/8" Saw Kit 9.6 volt | 270 | 145 |
| 6010SDW | 3/8" cordless Drill Kit 7.2V | 99 | 59 |
| ML900 | Incandescent Flashlight 9.6V | Sale | 37 |
| 6012HDWE | 2 speed Drill Kit w/2 batt. | 255 | 129 |
| 6093DW | v/spd Drill w/clutch-complete. | 283 | 139 |
| 6093DWE | 6093DW Drill Kit w/2 batteries | 296 | 145 |
| 6095DW | 6093DW Kit w/keyless chuck | 291 | 135 |
| 6095DWE | **6095DW Drill Kit w/2 batteries** | | 139 |
| 6201DWE | NEW 9.6V Drill Kit w/2 batt. | 310 | 155 |
| 6211DWE | 12V Drill Kit with 2 batteries | 342 | 168 |
| 632007-4 | 9.6 volt Battery | 48 | 30 |
| 632002-4 | 7.2 volt Battery | 40 | 28 |
| 5007NBA | 7-1/4" Saw w/electric brake | 263 | 124 |
| 5008NBA | 8-1/4" Saw w/electric brake | 316 | 188 |
| B04510 | 1/4 sheet Pad Sander | 106 | 54 |
| 9900B | 3" x 21" Belt Sander w/bag | 297 | 165 |
| 9924DB | 3" x 24" Belt Sander w/bag | 329 | 159 |
| 4301BV | Orb. var. spd Jig Saw 3.5A | 292 | 162 |
| JR3000V | var. speed Recip Saw w/case | 252 | 135 |
| LS1020 | 10" Mitre Saw 3.5 amp | 630 | 339 |
| 9820-2 | Blade Sharpener | 394 | 189 |
| N1900B | 3-3/4" Planer with case | 232 | 129 |
| 1911B | 4-3/8" Planer 7.5 amp | 309 | 139 |
| 9514B | 4" Disc Grinder 4.6 amp | 111 | 65 |
| 3601B | 1-3/8 HP Router | 288 | 158 |
| B04550 | 1/4 sheet Pad Sander w/bag | 98 | 49 |
| DA3000R | 3/8" Angle Drill | 314 | 148 |
| 2708W | 8-1/4" Table Saw | 585 | 275 |
| 2711 | 10" Table Saw with brake | 1067 | 509 |
| 6404 | 3/8" Drill Rev. 0-2100 rpm | 112 | 58 |
| 6510LVR | 3/8" Drill Rev. 0-1050 rpm | 168 | 88 |
| 6820V | 0-4000 rpm Drywall Gun | 171 | 92 |
| 6013BR | 1/2" Drill Rev. 6 amp | 280 | 138 |
| 5402A | 16" Circular Saw 12 amp | 743 | 395 |
| 3612BRA | 3 HP Plunge Router w/brake | 383 | 175 |
| 9401 | 4" x 24" Belt Sander w/bag | 378 | 205 |
| 4302C | var. speed Orbital Jig Saw | 351 | 185 |
| 5077B | 7-1/4" Hypoid Saw | 281 | 138 |
| LS1030 | NEW 10" Mitre Saw | 428 | 188 |
| 5007NB | 7-1/4" Circular Saw 13 amp | 232 | 116 |
| 2012 | 12" Portable Planer | 959 | 495 |
| LS1011 | 10" Slide Compound Saw | 946 | 498 |

## SIOUX TOOLS

| | | | |
|---|---|---|---|
| 8030 | New 3/8" var/spd Drill | 238 | 139 |
| 8000 | 3/8" var/spd close qtr Drill | 201 | 123 |
| 690 | 5" Air Random Orbit Sander | 139 | 132 |
| 690VV | 690 w/venturi dust collection | 281 | 175 |
| 658 | 5" Air Rndm Sander-dual action | 261 | 155 |

## SENCO AIR NAILERS

| | | | |
|---|---|---|---|
| SFN1 | Finishing Nailer 1" - 2" | 377 | 259 |
| SFN2 | Finish. Nailer 1-1/2" - 2-1/2" | 571 | 375 |
| SN325 | Nailer 1-7/8" - 3-1/4" | 665 | 425 |
| SLP20 | New Pinner w/case 5/8" - 1-5/8" | 399 | 269 |
| SKS | Stapler 5/8" - 1-1/2" | 351 | 245 |
| SN70 | NEW HD Framer 2" - 3-1/2" | 625 | 475 |

## BOSTITCH AIR NAILERS

| | | | |
|---|---|---|---|
| N80S-1 | Stick Nailer Super Sale | | 348 |
| N12B-1 | Coil Roofing Nailer | 845 | 395 |
| N60FN-2 | Finishing Nailer | 625 | 335 |
| T31 | Brad Nailer | 270 | 145 |
| CWC100 | 1 HP Pancake Compressor | 445 | 289 |

## EXCALIBUR Fences & Tables

| | | | |
|---|---|---|---|
| TT45R24L9 | 24" Fence | 369 | 299 |
| TT45R50L12 | 50" Fence | 399 | 318 |
| EXSLT30 | Sliding Table | 599 | 475 |
| EXSLT60 | Sliding Table | 745 | 585 |

## SKIL SIZZLERS

| | | | |
|---|---|---|---|
| 77 | 7-1/4" Worm Drive Saw | 257 | 144 |
| 2735-04 | 12 volt cordless Drill Kit | 249 | 132 |
| 2736-04 | 2735-04 with keyless chuck | 269 | 135 |
| 1605-02 | NEW Biscuit Jointer w/case | 221 | 129 |
| 3400 | 10" Table Saw - Bench Top | 270 | 179 |
| 3330 | 16" Scroll Saw - Bench Top | 205 | 135 |

## PANASONIC CORDLESS

| | | | |
|---|---|---|---|
| EY6205BC | NEW variable speed 12 volt Drill w/15 minute charger & case | 353 | 179 |
| EY620SEQK | Same as EY6205BC but battery has 40% more life & 20% more torque | 368 | 189 |
| EY6282EQK | Var. spd 9.6V Drill w/15 min. charger, case & NEW Ironman batt. | 315 | 168 |
| EY62821DKW | 9.6 volt Drill Kit w/2 batt. | 275 | 158 |
| EY6181CRKW | **NEW 9.6V PREDATOR Compact Drill Kit with 2 batteries - 10% more power than EY62821DKW** | | 158 |
| EY6207BC | NEW 12 volt 1/2" Drill w/keyless chuck var. speed w/15 minute charger & case | 420 | 222 |

## PASLODE IMPULSE GUNS

| | | | |
|---|---|---|---|
| IM250 | Trimpulse Finish Nailer Kit | 849 | 615 |
| IM325 | Impulse Framing Nailer Kit | 849 | 595 |

## HITACHI TOOLS

| | | | |
|---|---|---|---|
| M12V | NEW 3 HP var. speed Router | 477 | 225 |
| TR12 | Plunge Router 3 HP | 355 | 174 |
| F1000A | 12" Planer/6" Jointer | 2774 | 1549 |
| C10FA | 10" Deluxe Mitre Saw | 553 | 299 |
| C12FA | NEW 12" Mitre Saw | 600 | 315 |
| C8FB | 8-1/2" Slide Compound Saw | 1026 | 599 |
| FREUD LU91M008 | 8-1/2" Carb bld 48 t | 68 | 43 |

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## DEWALT TOOLS

| | | | |
|---|---|---|---|
| DW3547 | 7-1/4" Circ. Saw w/brake | 13 A | 275 | 145 |
| DW945K-2 | 3/8" 12V cdls Drill Kit w/2 batt | | 298 | 169 |
| DW944K-2 | 3/8" 9.6V cdls Drill Kit w/2 batt | | 277 | 144 |
| DW610 | 1-1/2 HP 2 handle Router | | 270 | 148 |
| DW411 | 1/4 sheet Palm Sander, 1.7 amp | | 97 | 58 |
| DW1003 | 3/8" Drill, 4 amp, 0-2500 rpm, rev. | | 116 | 68 |
| DW510K | 1/2" v/spd Hammer Drill w/case | | 298 | 165 |
| DW682K | NEW Biscuit Joiner with case | | 428 | 225 |
| DW705 | 12" Compound Mitre Saw | | 658 | 358 |
| DW615 | NEW 1-1/4 HP Elect. Plge Router | | 290 | 158 |
| DW625 | **NEW 3 HP var. spd Plunge Router** | | 275 | |
| DW675K | NEW 3-1/8" Planer with case | | 280 | 159 |
| DW431 | NEW 3 x 21 v/spd Belt Sander | | 320 | 182 |

## PORTA NAILER

| | | | |
|---|---|---|---|
| 401 | Porta Nailer complete | 265 | 198 |
| 501 | Face Nailer complete | 265 | 195 |

## WERNER LADDERS

| | | | |
|---|---|---|---|
| 6204 | 4' Fiberglass | 179 | 65 |
| 6205 | 5' Fiberglass | 199 | 75 |
| 6206 | 6' Fiberglass | 225 | 80 |

## WINTER KIT SPECIALS

| | | | |
|---|---|---|---|
| 9852K | Porter Cable 9852 Drill Kit w/extra batt | | 185 |
| 9853K | Porter Cable 9853 Drill Kit w/extra batt | | 185 |
| 7335K | Porter Cable 5" var. spd Random Orbit Sndr w/case & 1 roll 100X & 150X discs | | 273 | 169 |
| 7336K | Porter Cable 6" var. spd Random Orbit Sndr w/case & 1 roll 100X & 150X discs | | 278 | 175 |
| 555K | Porter Cable Plate Biscuit Jointer with case & 1000 assorted biscuits | | 339 | 195 |
| JS100K | Freud Jointer w/cs & 1000 bisc. | | 351 | 188 |
| 1581VSK | Bosch Top Handle Jig Saw with case & 30 Bosch blades | | 305 | 195 |
| 1582VSK | Bosch CLIC Barrell Grip Jig Saw with case & 30 Bosch blades | | 305 | 195 |
| JM100KK | Ryobi Joiner w/1000 biscuits | | 475 | 242 |

## BIESEMEYER FENCES

| | | | |
|---|---|---|---|
| B-50 | 50" Commer. Saw Fence | 345 | 298 |
| T-SQUARE 52 | 52" Homeshop Fence | 279 | 238 |
| T-SQUARE 40 | 40" Homeshop Fence | 259 | 208 |
| T-SQUARE 28 | 28" Homeshop Fence | 249 | 198 |

## WEDGE SMART LEVEL

| | | | |
|---|---|---|---|
| SM-PR2 | 2 FT Level with sensor | 120 | 88 |
| SM-PR4 | 4 FT Level with sensor | 150 | 105 |
| SM-PR6 | 78\ Level with sensor | 180 | 139 |
| SL224 | NEW 2FT Level with sensor | 79 | 55 |

| | | | |
|---|---|---|---|
| Msx636 FEIN | Triangle Sander Kit | Sale | 195 |
| LPN672 PONY | Air Palm Nailer w/glove | Sale | 94.99 |

## JORGENSEN ADJUSTABLE HANDSCREWS

| Item# | Jaw Length | Open Cap | List | Sale | Box of 6 |
|---|---|---|---|---|---|
| #0 | 8" | 4-1/2" | 19.00 | 11.75 | 58.00 |
| #1 | 10" | 6" | 21.76 | 12.50 | 68.00 |
| #2 | 12" | 8-1/2" | 24.95 | 14.50 | 78.00 |
| #3 | 14" | 10" | 31.61 | 18.00 | 99.00 |
| #4 | 16" | 12" | 42.30 | 23.95 | 139.00 |

## JORGENSEN STYLE 37 2-1/2"Throat 1/4"x3/4"

| Item# | Jaw Length | List | Sale | Box of 6 |
|---|---|---|---|---|
| 3706 | 6" | 9.86 | 6.05 | 32.50 |
| 3712 | 12" | 10.92 | 6.50 | 35.10 |
| 3718 | 18" | 12.05 | 6.99 | 37.75 |
| 3724 | 24" | 13.16 | 7.99 | 42.50 |
| 3730 | 30" | 14.70 | 8.85 | 47.75 |
| 3736 | 36" | 16.05 | 9.99 | 53.95 |

## PONY CLAMP FIXTURES

| Model | | List | Sale | Lots of 12 |
|---|---|---|---|---|
| 50 | 3/4" Black Pipe Clamps | 13.61 | 7.75 | 83.99 |
| 52 | 1/2" Black Pipe Clamps | 11.37 | 6.40 | 68.50 |

## BOSCH

| | | | |
|---|---|---|---|
| 1581VS | Top Handle Jig Saw | 275 | 145 |
| 1582VSC | NEW CLIC Barrell Jig Saw | 275 | 145 |
| | Bosch Metal Case for above Jig Saws | 34 | 32 |
| | Bosch 30 blade assortment for Jig Saws | | 27.99 |
| 1942 | Heat Gun 600° - 900° | 115 | 78 |
| 1272D | 3" x 24" Belt Sander with bag | 340 | 179 |
| 1273D | 4" x 24" Belt Sander with bag | 359 | 188 |
| 11-212VSR | Bulldog 3/4"SDS Rtry Drill | 370 | 198 |
| 1347AK | 4-1/2" Grinder w/case & access. | 175 | 104 |
| 1348AE | 5" Grinder 8.5 amp | 209 | 118 |
| 1194VSR | 1/2" var. speed Hammer Drill | 259 | 145 |
| 1194VSRK | above Hammer Drill w/case | 287 | 169 |
| 1608 | 5.6 amp Laminate Trimmer | 154 | 88 |
| 1609K | Lam Installers Kit with 1609 | 315 | 175 |
| 1609KX | Deluxe Installers kit | 369 | 198 |
| 1604A | 1-3/4 HP 2 Handle Router | 249 | 134 |
| 1604AK | same as above w/case & acc. | 299 | 169 |
| 1606A | 1-3/4 HP D-handle Router | 273 | 168 |
| 3258 | 3-1/4" Planer w/blade guard | 247 | 138 |
| 3258K | 3258 Planer with steel case | 273 | 154 |
| 3270D | 3" x 21" Belt Sander with bag | 270 | 145 |
| 1273DVS | var. spd 4\ x 24" Belt Sander | 380 | 204 |
| 1614 | NEW 1HP Plunge Router | 225 | 128 |
| 1614EVS | NEW 1-1/4HP v/spd Plge Rtr | 260 | 149 |
| 1613 | NEW 1-3/4 HP Plunge Router | 290 | 164 |
| 1613EVS | **NEW 2HP v/sp Plunge Router** | | 184 |
| 1615 | NEW 3 HP Plunge Router | 395 | 228 |
| 1615EVS | NEW 3 HP v/spd Plge Router | 460 | 244 |
| 1632VSRK | Recip Saw 8.4A orb-v/spd | 225 | 148 |
| 3050VSRK | 9.6V cdls v/sp Drill Kit comp | 256 | 138 |
| 3051VSRK | 3050VSRK w/keyless chuck | 266 | 145 |
| 1370DEVS | 6" Random Orbit Sander | 391 | 219 |
| 3283DVS | 5" Random Orbit Sander | 169 | 98 |
| 3283DVSK | 3283DVS Kit complete | 199 | 118 |

## ELU BY BLACK & DECKER

| Model | Description | List | Sale |
|---|---|---|---|
| 3338 | 2-1/4 HP v/spd Plunge Router | 448 | 249 |
| 3375 | 3-1/8" Univ. planer 7.2 amp | 329 | 155 |
| 3380 | Biscuit jointer with case | 569 | 248 |
| 3339 | NEW 3 HP v/sp Plunge Router | 500 | 274 |

## BLACK & DECKER

| | | | |
|---|---|---|---|
| 1166 | 3/8" Drill 0-2500 rpm 4 amp | 105 | 65 |
| 1703-1 | 10" Mitre Saw w/73-770 blde | 329 | 185 |
| 4011 | 1/4 sheet Palm Sander | 86 | 59 |
| 79-034 | Workmate 400 | 177 | 109 |
| 2694 | 7-1/4" Super Saw cat w/case | 275 | 152 |
| 2695 | 8-1/4" Super Saw cat w/case | 308 | 155 |

## DAVID WHITE

| | | | |
|---|---|---|---|
| LP6-20 | Sight Level package - 20x | 310 | 198 |
| L6-20 | Meridian Level - 20x | 290 | 185 |
| LT8-300 | Level Transit - 26x | 650 | 445 |
| LT8-300P | above Level w/optical plum | 769 | 519 |
| LT6-900 | Level Transit - 20x | 389 | 245 |
| ALT6-900 | Automatic Level - Transit - 18x | 549 | 385 |
| ALTP6-900 | above Level w/tripod & rod | 600 | 459 |
| ALP6-18HD | above Level w/tripod & rod | 550 | 369 |

## RYOBI SPECIALS

| | | | |
|---|---|---|---|
| JP-155 | 6-1/8" Jointer/Planer | 648 | 305 |
| TS-254 | 10" Mitre Saw | 420 | 198 |
| RE600 | 3 HP Plunge Router | 465 | 215 |
| BE321 | 3" x 21" var. spd Belt Sander | 290 | 135 |
| TFD222VRK | 12V cordless Drill Kit | 325 | 172 |
| JM100K | Biscuit Jointer w/case | 453 | 209 |
| BT3000 | 10" Table Saw with stand | 1204 | 545 |
| TSS220 | 8-1/2" Slide Comp. Saw | 966 | 445 |
| DS1000 | NEW Detail Sander | 90 | 44 |
| RS112 | Palm grip Rndm Orb Sndr | 90 | 55 |
| AP12 | NEW 12" Bench Planer | 884 | 399 |
| RA202 | NEW 8-1/4" Bench Radial Saw | 695 | 398 |
| BS900 | NEW 9" Bench Band Saw | 298 | 174 |
| IDV26 | NEW 28 Gal. Industrial Dry Vac | 198 | 119 |
| OSS450 | NEW Oscilating Spindle Sander | 298 | 174 |

## LAMELLO BISCUIT JOINTERS

| | | | |
|---|---|---|---|
| TOP 10 | "Simply the Best" | 699 | 545 |
| STANDARD 10 | "Professionals Choice" | 499 | 399 |
| COBRA | NEW Biscuit Joiner | Special | 285 |

## QUAL-CRAFT PRODUCTS

| | | | |
|---|---|---|---|
| 2200 | Pump Jack | 79 | 58 |
| 2201 | Pump Jack Brace | 30 | 20 |
| 2203 | Pump Jack guard rail holder | 31 | 21 |
| 2204 | Workbench & rail holder combo | 53 | 39 |

**Buy any 6 (can be assort.) deduct 10%**

| | | | |
|---|---|---|---|
| 2601 | Wall Jack | 167 | 108 |

**Lots of 4 deduct additional 10%**

## PORTER CABLE

| | | | |
|---|---|---|---|
| 690 | 1-1/2 HP Router 8 amp | 255 | 138 |
| 9690 | 690 Router with steel case | 305 | 149 |
| 691 | 1-1/2 HP Router D-handle | 280 | 149 |
| 695 | 1-1/2 HP Router/Shaper | 390 | 218 |
| 696 | HD Shaper Table | 225 | 129 |
| 351 | 3" x 21" Belt Sander w/o bag | 270 | 148 |
| 352 | 3" x 21" Belt Sander with bag | 280 | 154 |
| 360 | 3" x 24" Belt Sander with bag | 350 | 194 |
| 361 | 3" x 24" Belt Sander w/o bag | 330 | 184 |
| 362 | 4" x 24" Belt Sander with bag | 365 | 198 |
| 363 | 4" x 24" Belt Sander w/o bag | 345 | 189 |
| 315-1 | 7-1/4" Top Hdle Circular Saw | 220 | 118 |
| 9315-1 | 315-1 comp. w/cs & carb bld | 250 | 139 |
| 617 | 7-1/4" Pushhandle Saw | 220 | 124 |
| 9617 | 617 comp. w/cse & carb blde | 250 | 142 |
| 97751 | 1/2" v/spd Hammer Drill w/cse | 265 | 155 |
| 9118 | Porta Plane Kit 7 amp | 380 | 209 |
| 505 | 1/2 sheet Pad Sander | 225 | 118 |
| 6611 | 3/8" var. speed Drill 5.2 amp | 210 | 118 |
| 6614 | 1/2" var. speed Drill 0-750 rpm | 220 | 124 |
| 6615 | 7514 with keyless chuck | 220 | 124 |
| 7549 | Top handle Jig Saw 4.8 amp | 260 | 145 |
| 330 | Speed Block Sander 1/4 sheet | 105 | 60 |
| 555 | Plate Biscuit Jointer with case | 320 | 168 |
| 556 | **555 w/5556 tilt fnce & 100 biscuits** | | 175 |
| 345 | 6" Saw Boss 9 amp | 190 | 104 |
| 9345 | 345 comp. w/cse & carb blde | 220 | 119 |
| 9647 | TIGER CUB Recip. Saw | 205 | 117 |
| 9637 | Full var/spd Recip Saw 8 amp | 265 | 148 |
| 7519 | 3-1/4 HP Router 2 Handle | 430 | 234 |
| 7518 | 3-1/4 HP 5 speed Router | 495 | 268 |
| 7538 | 3-1/4 HP Plunge Router | 430 | 234 |
| 7399 | 5.6 amp Drywall Cutout Unit | 140 | 89 |
| 7310 | 5.6 amp Laminate Trimmer | 160 | 92 |
| 97310 | Laminate Trimmer Kit comp | 355 | 195 |
| 7334 | 5" Random Orbit Sander | 221 | 119 |
| 7335 | 5" var. spd Rndm Orbit Sndr | 241 | 129 |
| 7336 | 6" var. spd Rndm Orbit Sndr | 246 | 137 |
| 73333 | Dust Collection system | 31 | 24.50 |
| 693 | 1-1/2 HP Plunge Router Base | 315 | 172 |
| 6931 | Router Plunge Base | 125 | 77 |
| 7539 | 3-1/4HP var/spd Plunge Router | 495 | 264 |
| 9852 | 12V 3/8"Drill w/cse 0-1000rpm | 280 | 149 |
| 9853 | 9852 with keyless chuck | 280 | 154 |
| 9855 | 12V 1/2" 2 spd. v/spd Drill w/cse | 335 | 184 |
| 8500 | 12V battery for above drills | Sale | 45 |

**New Tools by Porter Cable**

| | | | |
|---|---|---|---|
| 9841 | 9.6V Drill Kit-15 min. charger | 309 | 169 |
| 9840 | 9.6V Drill Kit with 2 batteries | 289 | 164 |
| 332 | Palm Grip Rndm Orbit Sander | 116 | 64 |
| 333 | above Sander with dust bag | 131 | 68 |
| 334 | 333 Sander with PSA pad | 131 | 74 |
| 352VS | 3x21 Belt Sander w/bag v/spd | 295 | 165 |
| 7116 | 24" Omni Jig | 530 | 294 |
| 550 | Pocket cutter with case | 330 | 185 |
| 310 | Production Laminate Trimmer | 250 | 145 |
| 7700 | 10" "Lazerloc" Mitre Saw | 634 | 339 |

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# FINISHING TOUCHES

## SING A SONG OF WOOD

By day, professional woodworker Robert Ortiz designs and builds exquisitely crafted, custom furniture in his Baltimore shop. But by night, he plays conga drums in an acoustic musical group called "Terra Nova." Pamela Cardullo, his wife, writes most of the quartet's music. For their latest 10-song album, *Beyond the Gate,* Pamela created a lyrical ballad about the material her husband knows so intimately.

Its words should strike a familiar chord with every woodworker. In part, here's how the song goes:

**Woodworker Robert Ortiz, *center*, and fellow musicians Tom Scullen, *left rear*, Mark Divita, *right rear*, and Pamela Cardullo, sing the song of wood on their new, all-original album.**

**The cherry desk, *above,* was designed and built by Robert and his associates.**

***To inquire about Terra Nova's album, write: Terra Nova, Dept. W, 416 George St., Baltimore, MD 21201.***

***The Story of the Wood***
*Respect the eye that chose this tree beneath the forest canopy*
*It was the last eye to see it in its glory*
*It knew the tale the wood would tell, but could not speak until it fell,*
*It chose this story for ourselves like a good book off the shelf.*

*Chorus*
*The story of life's seasons is the ballad that it sings*
*Our lives are marked and bound together by concentric rings*

*Respect the heart and mind that conceived a new design*
*That would bring together disparate slabs of timber*
*To rebuild the tree anew in a form both me and you*
*Could appreciate in awe what God's eye alone once saw. Chorus*

*Last of all respect the hand that took these pieces and this plan*
*And added skill and art and all that it was able,*
*The hand that chiseled, carved and planed,*
*that sanded once and twice again*
*And now the story of the wood is more clearly understood*
*As it speaks to us through this chair and table. Chorus© 1993*

## TOY-CONTEST COUNTDOWN

If you're counting the days to *WOOD®* magazine's 1994 Build-A-Toy Contest deadline, you still have about 45 of them to get your entry in. Toys must be received in Des Moines by February 1. Hey, you can do it! Help a needy child enjoy the holidays.

### Getting a treeful

Swedish sawmills manage to use 98 percent of a tree. In comparison, Malaysian ones use only 40 percent. Although constantly striving to reduce waste by utilizing more and more of the tree for a variety of wood products, U.S. sawmills still hover at about 75 percent of full usage, says the U.S. Forest Products Association.

## SO LONG, THANKS FOR YOUR HELP

Tree-farm walnut trees, to grow good and straight, require plantings of other trees between the rows. These trainer trees, as tree farmers call them, keep the grass down with their shade, give wind protection, and provide needed nitrogen to the walnuts' roots. The plantings of olive, alder, and white pine—ideal trainer trees—also encourage the walnuts to shoot up in search of the sun, shedding any lower limbs (self-pruning) in the process. But, says the National Arbor Day Foundation, when the walnut trees grow large enough to no longer need their helpful neighbors, they kill them off with releases of the chemical juglone from their roots.

Illustrations: Brian Jensen, Jim Stevenson

# NOW! PLANE, MOLD, SAND and SAW with

# *Infinitely Variable Power-Feed!*

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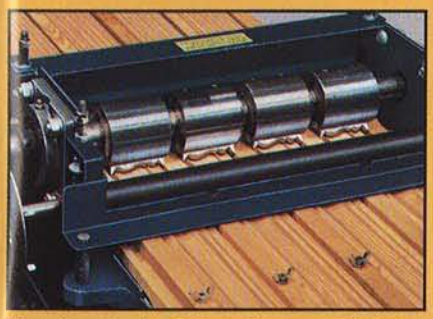
Put this versatile power-feed tool to work in your shop . . . see how fast it pays for itself! Quickly converts low-cost rough lumber into valuable finished stock. Turns out perfect picture frame moldings, quarter-round, casing, tongue and groove . . . all popular patterns . . . any custom design.

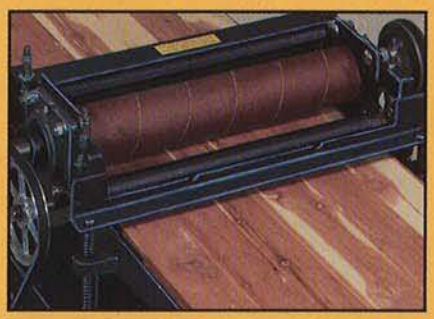
**Just a twist of the dial** puts twice as many cuts-per-inch at your fingertips as any comparable planer – from 70 to over 1,000 CPI! This heavy-duty machine will sail through even the toughest oak at higher speeds, or you can slow it down to handle those "hard-to-work" pieces like curly maple, knotty cedar, burls, knees and much more! A valuable feature for molding work, where profiles make sanding impossible.

**Change to Molding, Sanding or Sawing in just minutes!** Unique "Morse-Taper" Quick Change Cutterhead guarantees fast changeover . . . bearings remain factory set . . . precisely aligned at all times.

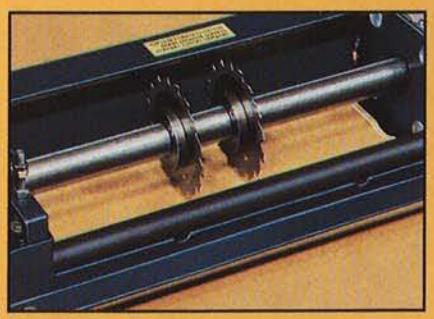
**Now choose from three powerful models!** Woodmaster introduces the first 18″ and 25″ Planer/Molders . . . with all the features that have made the 12″ model the most versatile Planer/Molder on the market! Send for Free Facts today!



**Woodmaster's Quick-Change Molding Head lets you create custom moldings from any stock. Choose from over 250 standard trim and picture frame patterns . . . or design your own!**



**Power-fed sanding speeds production and improves the quality of your work. No more waves or cross-grain scratches. Separate sanding head installs in just minutes.**



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**Shop Test Results**–"It does an excellent job of planing, on a par with more expensive machines, and even better than some commercial models."

*Editor, Workbench Magazine*

**Best Value**–"After checking them all, Woodmaster was obviously the best deal for the money. Also, I would like to acknowledge the polite and prompt service."

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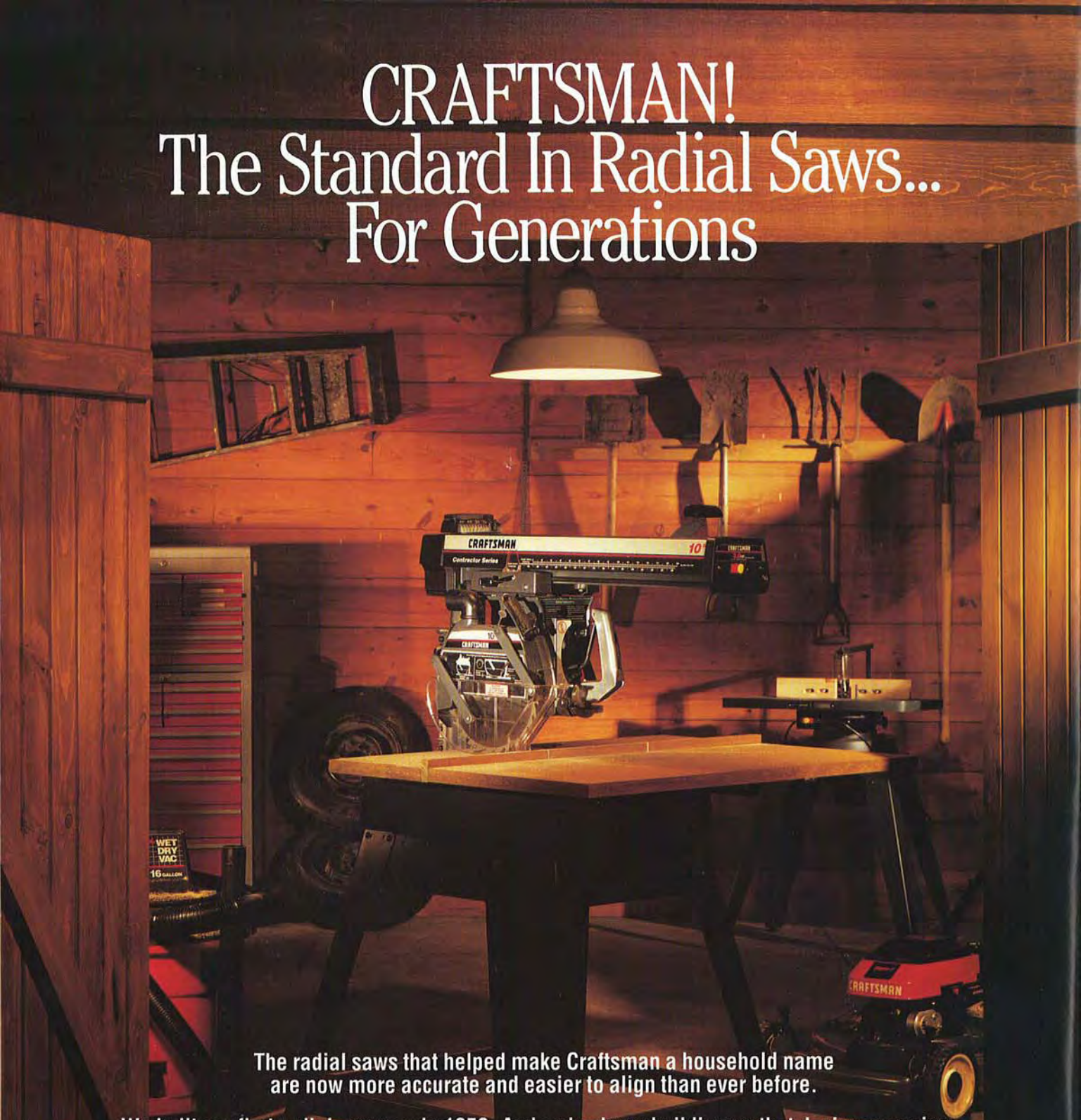


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